Bell Telephone MAGAZINE

AUTUMN 1955

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Bell Telephone Magazine

A non-technical review, published quarterly to give Bell System management people a broader view of the history, objectives, operations, and achievements of this business than they might attain in the course of their day-to-day occupations, and an added sense of participation in the problems and accomplishments of our nation-wide public service.

A MEDIUM OF SUGGESTION and A RECORD OF PROGRESS

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JUDSON S. BRADLEY, *Editor* SALVATORE J. TAIBBI, *Art Editor*

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Who's Who & What's What

IN THIS ISSUE

WRITTEN ESPECIALLY for this MAGAZINE, ROBERT H. SIMPSON's article about hurricanes both recognizes the gravity of their menace to every aspect of life in this country's Atlantic area and holds out new hope that eventually they may be controlled. After courses at Southwestern University and Emory University, he joined the U. S. Weather Bureau in 1940 as a meteorologist. In 1945 he became also a technical adviser to the Air Force, and later Aviation Weather Specialist for the Weather Bureau. While directing the collection of research data from aircraft, he has flown with the Air Force into several hurricanes and typhoons from bases in Panama, Bermuda, and Guam. All of which qualifies Mr. Simpson, obviously, for his most recent appointment as Director of Project Wildwind, a long-range investigation into the cause and cure of hurricanes.

A MEMBER OF THE Public Relations Department of the Southern New England Telephone Company since June of 1954, LEIGHTON C. GILMAN is now on the staff of that company's employee magazine, *The Telephone Bulletin*. He was on his way home from a vacation in Maine last August when he stopped in Putnam, Conn., to take a few pictures—and stayed there a full week. It is with this background that, at our request, he recounts Putnam's ordeal of fire and flood.

Robert H. Simpson

Leighton C. Gilman

John H. Mitchell

PLAYING A RETURN ENGAGEMENT, even to the accompanying photograph, JOHN H. MITCHELL reports on hurricane damage much as he did in last Winter's issue, to which he contributed "Planning Ahead to Meet Disaster When It Hits." He joined the Long Lines Department in 1946, after two years in the Signal Corps. Experience in Washington and New York preceded his assignment as district plant engineer in Richmond, Va., and it was from that post that he joined the Plant division of A. T. & T.'s O. & E. Department a year ago.

STARTING IN THE Plant Department of the Lehigh Telephone Company in Hazleton, Pa., in 1924, JOHN MARKLE II was traffic manager when that company became part of the Bell Telephone Company of Pennsylvania in 1930. He has held various Traffic responsibilities since that time, including that of general traffic manager in Pennsylvania's Central and Eastern Areas. Mr. Markle has been vice president in charge of personnel since 1950, and the development of an Institute of Humanistic Studies is a project close to his heart.

THE TWENTY-SIXTH FLOOR of the Long Lines headquarters building in New York, with its view of the world's busiest harbor and the ships from far and near that come and go, is a good place for dreaming dreams with a purpose. Since he joined the Long Lines Department at Atlanta in 1919, HENRY T. KILLINGSWORTH has had various responsibilities concerned with the expansion of voice communication to world-wide range—as predicted by the founders of the telephone business. Plant, engineering, and administrative assignments in Long Lines offices from Denver to New York, with another assignment in Atlanta included, had prepared him by 1949 for an A. T. & T. vice presidency and responsibility for the Long Lines Department, with which he has now spent "going on to" four decades.

(*Continued on page 211*)

John Markle II

Preparations for Diane were thorough at A. T. & T. Headquarters in New York.

The cause of recurrent natural disasters in the eastern section of this country is being studied intensively, in an effort to develop some step effective against them

THE WEATHER BUREAU SIZES UP THE HURRICANE PROBLEM

ROBERT H. SIMPSON

Director, PROJECT WILDWIND, UNITED STATES WEATHER BUREAU, WASHINGTON, D. C.

IN LESS THAN TWELVE MONTHS, hurricanes have caused more than two billion dollars' damage and the loss of more than 350 lives in northeastern United States. As disasters go, the loss of life, while large, sets no records. But never in history has a natural disaster caused so much damage as occurred during "Carol" in 1954, or subsequently during the floods from "Diane" this year. From the four corners of a nation aroused and alarmed by these experiences, the question is being asked, "What does this mean?—What can we do about the hurricane menace?" The answers pose a challenge not only to the Weather Bureau, which holds primary responsibility for weather and flood warnings, but to the scientific imagination, ingenuity, and initiative of the nation as a whole. Unquestionably there are many important things which can be done. The only question is how far we should go, for the cost will not be small.

The hurricane problem comprises essentially three categories of interest:

1. The forecast problem.
2. The question of hurricane vulnerability.
3. Weather control measures.

It will help us to understand what the possibilities are in dealing with the hurricane menace if we discuss briefly the nature of the problem in each of these categories.

Hurricane Forecasting

THE HURRICANE USUALLY FORMS over remote areas of tropical oceans where deep layers of warm air are heavily laden with moisture. Its violent whirling winds are set in motion when air is drained away from one area by currents in motion at high levels, causing pressure at the surface to fall. As air near the surface surges in toward lowering pressure and is deflected (by the earth's rotation) into a spiraling path, it encircles the point of lowest pressure and is forced to rise, while still more air converges from the environment. The heavy

Figure 1: The Carrying Currents for the Hurricane. Hurricanes are born in a great band of east winds known as the trades. In this environment they move westward toward Continental United States, where they curve northward and eventually join the jet stream and its associated belt of west winds. Where the hurricane ultimately moves depends in part upon the latitude at which it forms.

rains which develop in the rising air release latent heat of condensation, the fuel upon which the hurricane depends for its energy and its growth.* The problem of forecasting hurricane formation, then, is mainly one of identifying and anticipating the arrival of conditions which will drain off air at high levels over ocean areas where a sufficient supply of warm moist air exists. This is an important forecast task, for not all hurricanes form in remote areas. On many occasions, conditions develop which permit them to form close enough to the U. S. mainland to threaten the coast within less than 24 hours.

Forecasting hurricane formation is often made more difficult because of insufficient

* A recognized meteorological phenomenon.

reports to analyze and identify those circulations which cause air to be drained away and surface pressures to fall at critical locations.

Once formed, the hurricane is carried "downstream" by the large river of air in which it is embedded. Hurricanes almost invariably form in a region where trade wind easterlies prevail. Figure 1 illustrates how these trade winds, usually sluggish and slow moving, spread westward across the oceans and split into two branches. One continues westward while the other curves northward to join the great band of westerlies which at the middle latitudes encircle the hemisphere. At the core of these westerlies is a narrow fast-moving current of air which meteorologists call the jet stream,* and which, as we shall see, sometimes plays an important role in redirecting the course of the hurricane. From Figure 1 it is evident that the general track of the storm is in part determined by the latitude at which it forms. If it first appears at very low latitudes, it may move across the Caribbean and Yucatan; if at a higher latitude initially, it will tend to recurve northward before reaching the U. S. mainland.

The schematic pattern of large-scale air currents presented in Figure 1 is typical of conditions at the height of the hurricane season. Unfortunately, this pattern is not dependably persistent. While the movement, both in the trade wind and jet stream regions, constantly tries to return to this typical pattern, there is a continual fluctuation of the channels through which the streams flow. Troughs * in the meandering path of the jet stream tend to move progressively eastward. Partly in response to these basic changes, the location at which the trade winds branch, and also the amount of the current which is diverted northward, varies. At times when the jet stream trough is returning to its customary position on the U. S. East Coast, and the jet is fully energized, it breaks out of its usual channels and surges far southward. As this occurs the trade winds are rolled back and hurricanes along this meridian, even at relatively low latitudes, are snatched up by the jet and propelled rapidly northward. This is illustrated in Figure 2.

THE JOB OF FORECASTING hurricane movement begins with two basic tasks; first, the description or analysis of the large scale air movements which are carrying the currents of the hurricane, and second, the prediction of changes in channel which the carrying currents will experience during the period of the forecast. To do the job properly the forecaster must analyze and maintain a continual vigil of jet stream movements over more than half a hemisphere. Actually the energy sources and impulses which impel the jet stream to surge out of its established channels, as in Figure 2, sometimes are found as far away as mid Pacific. Dramatic changes like those in Figure 2 are among the most difficult to forecast precisely. This is the sort of transition which in 1954 sent Carol reeling northward into New England—400 miles in 12 hours, after dawdling for nearly 72 hours in the more sluggish north branch of the trade winds. This is also the type of forecast problem which has accompanied each of the several East Coast snow storms of recent years. While standard forecast methods can detect qualitatively the onset

* The jet stream is a "tube" of fast-moving air centered near 40,000 feet. As the jet stream proceeds eastward around the hemisphere, it follows a meandering path, deviating to the north around ridges of high pressure and to the south around troughs of low pressure. When intense troughs draw the jet stream far south, hurricanes in its path are swept northward with great speed.

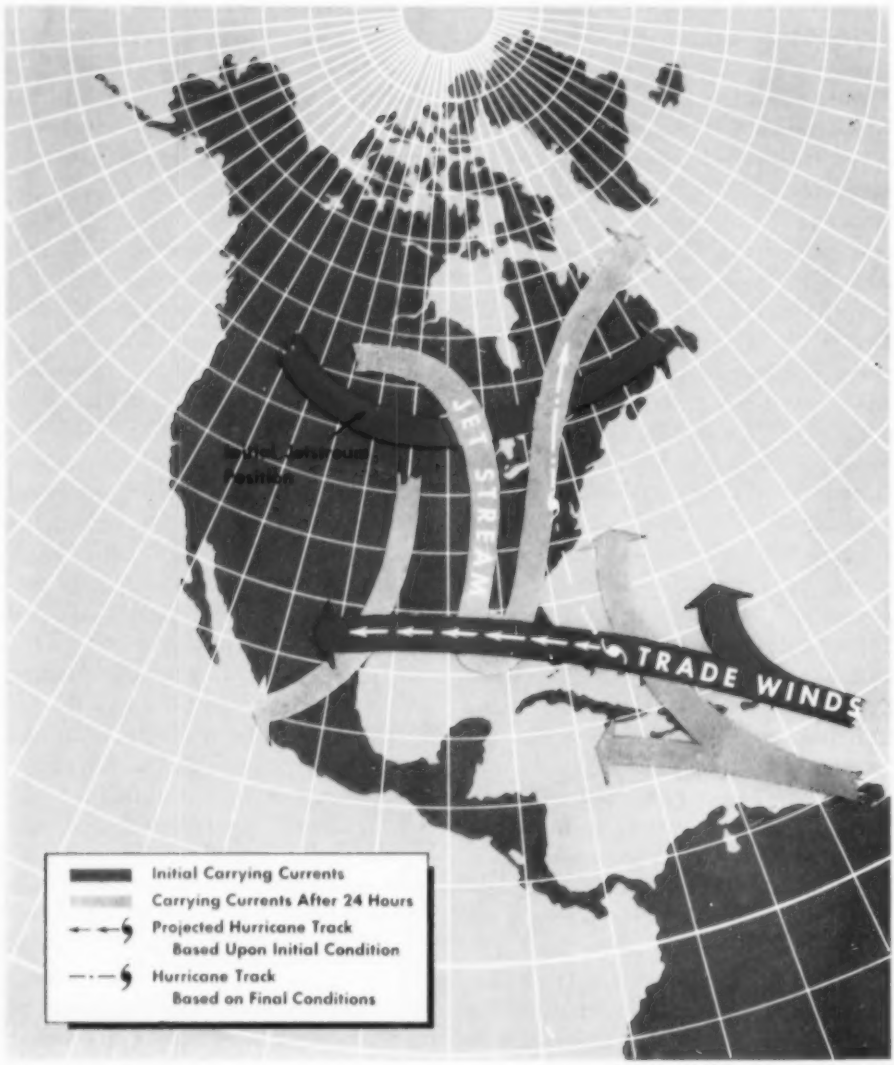


Figure 2: In hurricane forecasting, it is necessary first to describe the channels of the currents which carry the hurricane, then determine what changes in channel will occur during the forecast period. Here the carrying current in the belts indicated in solid red undergoes in 24 hours such radical changes as shown by the channels in lighter color. When this happens, a hurricane which appears likely to move far westward over Florida may be whisked northward into New England with little advance notice.

of these changes, they often fall far short in quantitatively predicting such factors as *how far south* and *in what strength* the intrusions of the jet stream will occur. In dealing with this large-scale aspect of forecasting, the Weather Bureau is counting heavily upon further development of numerical weather prediction methods, using the electronic computer to integrate complex expressions for which only rough approximations have been possible previously. An IBM 701 computer, installed earlier this year in the Joint Numerical Weather Prediction Unit at Suitland, Md., has been used experimentally for this purpose for the last six months.

Unfortunately, in hurricane forecasting, the solution of the large-scale problem is only a first approximation. The reason for this is best illustrated by Figure 3, the track of hurricane Edna, and Figure 4, which describes the distribution of danger about a hurricane path. The hurricane tends to move in a wobbly path, the geometry of which is as yet undetermined. However, it is of considerable importance that the forecaster be able to refine the general track to compensate for the zigs and zags. A matter of 20 to 30 miles in the point at which the center crosses the coast can mean the difference between the damage resulting from 50–60-mph winds, and the disaster which accompanies heavy inundation from the sea with winds greater than 100 miles per hour. The solution to this and a number of other important problems in hurricane forecasting necessarily depends upon a more complete understanding of hurricane structure and the manner in which energy is exchanged between the hurricane and its environment. With this objective in mind, the Weather Bureau is

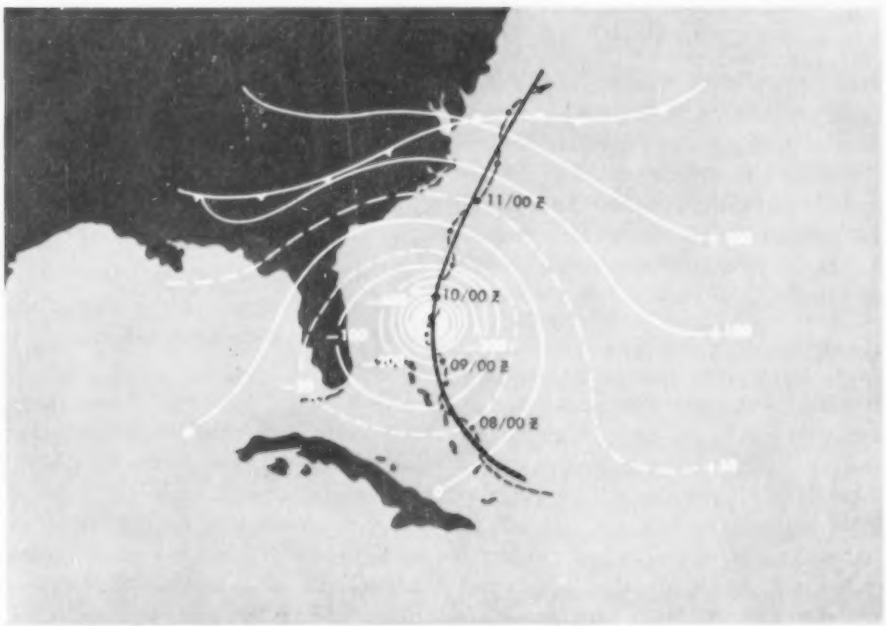


Figure 3: The track of Hurricane Edna.

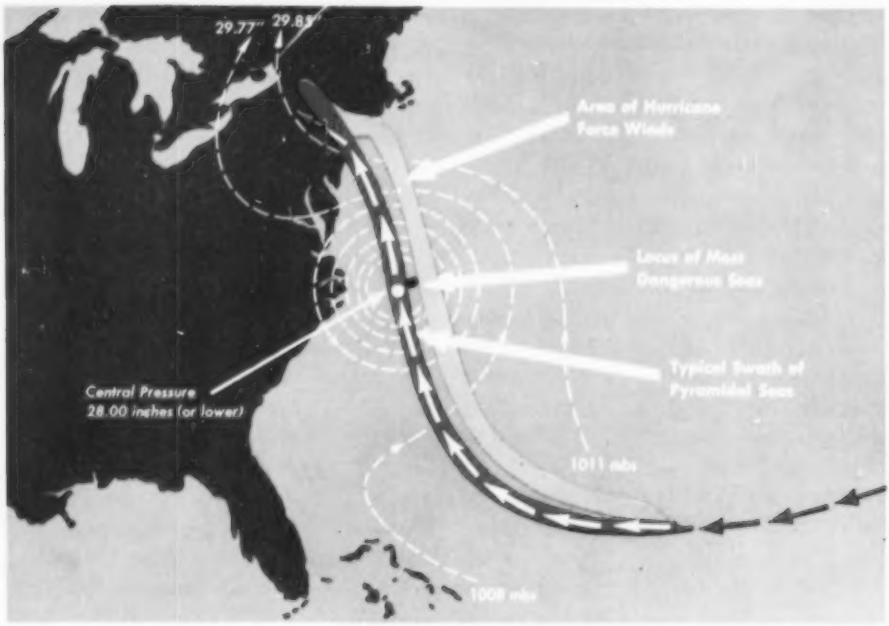


Figure 4: The color bands represent the area of hurricane-force winds of a storm whose center is moving in the direction of the arrows. The area between them includes the most intense winds, and it is here that the dangerous pyramidal seas are generated.

launching an all-out investigation of hurricane structure in 1956, a three-year program to be known as *Project Wildwind*. The Project will use three flying laboratories to probe the hurricane from top to bottom and collect sufficient data to permit the computation of an energy budget for the storm.

Hurricane Vulnerability

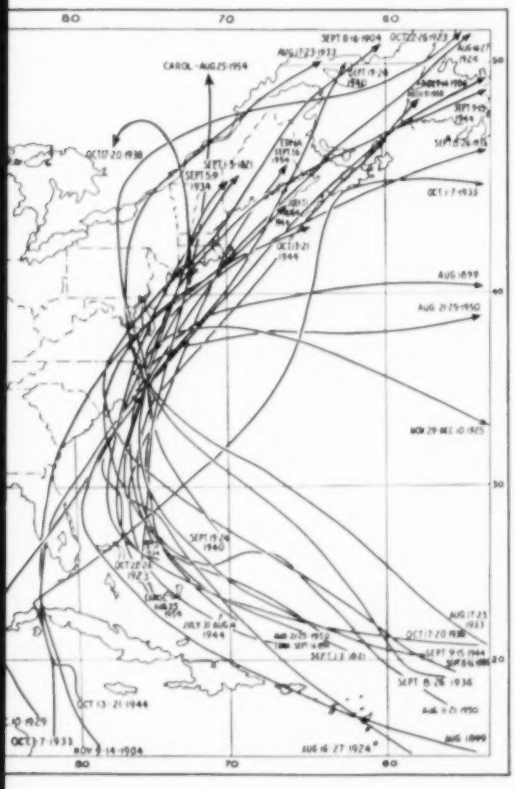
PERHAPS THE MOST IMPORTANT QUESTION to utilities, to insurance companies, and to business of all kinds, arising from our recent hurricane disasters is whether or not New England and the middle Atlantic States are becoming more vulnerable to hurricanes. The answer is being energetically sought by the Weather Bureau and by meteorologists outside of government, but this is not an easy question to answer. First, while an average of about ten tropical storms form in the greater Atlantic each year, the number varies greatly from year to year. Moreover, in some years storms form only during mid-season, while in other years they occur mainly in late or early season. Since carrying currents for the hurricane migrate considerably as the season advances, the analysis is even more difficult.

Of the ten tropical storms which form on the average each year, two occur in the Gulf of Mexico, three in the Caribbean, and the remainder elsewhere in the Atlantic. Of those which grow into full hurricanes, only two cross the coast of the United States.

Turning now to Figure 5, there are at least twenty important hurricanes since

1820 which have either directly affected New England or have been near misses. It is interesting to note that virtually all have passed within less than 100 miles of Hatteras in their journey northward. It is of even more importance that a change in course of as little as 10 degrees, as these hurricanes passed Hatteras, would generally have spelled the difference between little damage to New England and serious disaster to that area. It is just such small differences that we are trying to evaluate in answering the questions which have been raised concerning hurricane vulnerability.

Figure 5: Hurricanes since 1820 which have directly affected or come close to New England.



Jerome Namias, Weather Bureau long-range forecast expert, has attacked the problem by concentrating his attention upon the forces shaping the channels of large circulations—such as trade winds and "westerlies"—which carry whatever hurricanes form. His analyses thus far point to an anomalous condition which has developed during the past twenty years in the western Atlantic. Here a rise in pressure has tended to shunt the carrying current from the south into channels which would tend to move hurricanes closer to the New England coast than before. At the same time, the jet stream trough has receded from its normal position near the coast to a position farther westward. These changes may be the result of fortuitous circumstances and the trend may already be returning to normal. Again, they may be a manifestation of progressive changes in climate. If so, we shall probably have to look farther than the northeastern U. S. for complete verification.

There is no agreement among meteorologists about the cause of a changing climate nor, indeed, that it is changing. If one begins with the assumption, however, that these anomalies are a part of our changing climate, then we may ask what sort of changes in available energy would create these anomalies, and where the injection of energy in abnormal amounts would give rise to the observed anomalies. This line of inquiry turns up at least three possibilities:

1. A shift in ocean currents and warmer sea surface temperatures in the western Atlantic;
2. A similar shift in mid-Pacific, or
3. An increase in receipt of solar radiation, causing greater continentality or summer heating of the North American continent.

Another Weather Bureau scientist, Harry Wexler, has pointed particularly to the latter possibility. He reasons that more sunshine is now reaching the earth's surface because volcanic dust from cataclysmic eruptions such as Krakatoa, long suspended in the high atmosphere, is gradually settling out. There is an increasing amount of observational evidence in support of this concept. However, it is important also that a thorough investigation of trends in sea surface temperatures be conducted. The Weather Bureau expects to begin work on this problem in the near future. Meanwhile, there is apparently no conclusive means of determining whether or not hurricanes are going to be regular visitors to the New England coast. In any event, using any climatological yardstick, New England has had more than its share of hurricane visitation in recent years, and even the mathematical probability of another Carol, Hazel, or Diane affecting the same areas within ten years or more is exceptionally small.

The Weather Control Problem

WITH LOSSES FROM HURRICANES exceeding two billion dollars in less than twelve months, the question of controlling the formation or modifying the behavior of hurricanes is one which must receive the most careful attention. There is no reason to believe we cannot find how to make hurricanes behave. It is not likely to be an easy job, however, and without question the research and development required would place the undertaking in a class with the Manhattan Project.

To begin with, it is well to ponder the simple fact that *a hurricane the size of Edna, 1954, expends more energy in one minute than is developed in electric power by all generation sources in the United States in fifty years!* To manhandle a system of such strength as this, it will be necessary to locate its "Achilles heel"—if it has one—and find a means of trampling on it. Evidence from data gathered in the past two years suggests that there is reason to believe the hurricane may indeed have an Achilles heel where the application of a little energy will accomplish a large amount of work. The hurricane does not operate in steady state as a well governed machine. It is a massive area of imbalances in which a majority of the motions are accelerative. It is not a closed system in which the same air continues to circulate through the machine. Moreover, in Nature we see spectacular things happen to hurricanes in short periods of time—great changes in intensity and important changes in direction of motion without clear evidence of large changes of input energy to the storm.

Nevertheless, it would almost seem to be folly to apply at random the so-called shotgun approach to research on hurricane control. The atom or hydrogen bomb, random cloud seeding, or other means used under conditions which offer little means of evaluating in advance the probable effect, or of later assessing the actual results, are haphazard—if not desperate and potentially dangerous—approaches to a scientific problem. The only sound approach is to determine first the intimate details of hurricane structure which will permit a systematic search for the Achilles heel. Then will be time to begin our experiments in disciplining these great storms.

Project WILDWIND, with its special aircraft probings of the hurricane vortex beginning July 1956, should go a long way toward providing information on storm structure which is essential in developing an intelligent all-out program of research and development on hurricane control.

Diane's flood wrecked a typical New England community —one of many—whose telephone service was among the first essentials to be restored to its stricken people

PUTNAM LIVED TO SERVE ANOTHER DAY

LEIGHTON C. GILMAN

Public Relations Assistant, THE SOUTHERN NEW ENGLAND TELEPHONE COMPANY

Telephone plant in six northeastern states was devastated last August by floods which were the wicked step-sister of the hurricane called Diane. Though the pattern differed in each community, the cause was basically the same: torrential rains which turned streams and creeks and rivers into devouring monsters hungrily consuming people, bridges, buildings, highways—and anything else that stood in their erratic way. Central offices elsewhere were flooded out, of course; but we may let this vivid report of how the situation was met and overcome in Putnam represent the courage, the resourcefulness, and the will to serve which have won out everywhere over a disaster ranked as one of the century's worst. EDITOR.

FOR THE 10,000 RESIDENTS of Putnam, 1955 will go down in history as a year of disaster. Putnam's centennial celebration turned into a period of destruction—destruction caused by flood waters of the Quinebaug and French Rivers, which merge just north of this quiet textile city in the northeast corner of Connecticut.

After a joyous centennial celebration, Putnam was just returning to normal when the flood came, on August 19. Explosions and fires came with it. A magnesium plant exploded, sending mushrooming clouds of an atomic-like blast into the sky. Two textile finishing plants burned the following night, again lighting the sky with noontime brightness. But it was the floods that did the most damage: more than twenty-five million dollars' worth. About 12 inches of rain, one-third of a normal year's rainfall, fell in 24 hours.

So rapid was the rise of the waters that most people had little chance to save anything more than their most prized posses-

sions. In some cases, not even these were salvaged. Fortunately, Putnam suffered no fatalities as a result of the flood.

The Putnam exchange of The Southern New England Telephone Company served about 7,100 telephones in Putnam and several outlying areas. Dial service was introduced in 1951. Although toll-centered on Danielson, a few miles south, it was the test and assignment center for Danielson and Moosup. The new one-story brick building housing plant and commercial quarters was located on Main Street.

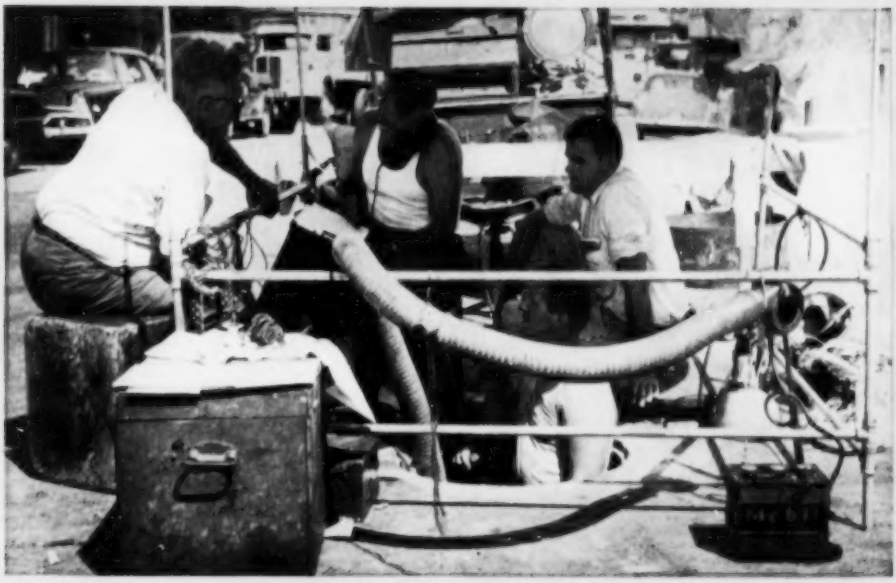
FRIDAY, AUGUST 19, was a day not unlike any other rainy summer day. No one at the Putnam office realized the area was endangered. Radio reports said some communities in Massachusetts were flooded, but there was no report of danger for Putnam.

By 10 a.m., however, the situation had changed radically. Police alerted people in downtown areas. As the Quinebaug River rose, Plant Service Supervisor Elmer Cole ordered sandbags placed around the office. One plant man said the water came down Main Street so fast he didn't have a chance to tie a sandbag he had just filled. "I just left it there and ran," he adds.

Less than an hour later, two service representatives had to be carried out by plant men wading through the street in hip-deep water. "We were just putting records and cash away when we looked out and found ourselves marooned. The water was coming down the street as if it had just broken through a dam," said one.

Plant men, including outside forces from Danielson, were busy trying to keep the city's telephones in working order. After commercial power failed at 11:50, the of-

While the Quinebaug River still raged, a 1200-pair cable replaced the cable which had been carried under the destroyed bridge.



The cable to Danielson, tapped at this manhole, provided emergency service locally and a link with the outside world.

Outdoor telephone booths were busy spots during the 100 hours Putnam was without regular service.

An emergency PBX was installed in the former telephone building to provide service for disaster agencies.

First entry into the central office, about 24 hours after the flood hit.

This is the mess of muck left in the business office.

Left, below: Eugene S. Loughlin, chairman of the Connecticut Public Utilities Commission and a former president of the National Association of Railroad and Utility Commissioners; J. Raymond Ryan, general plant manager of the Southern New England Company; and author Leighton Gilman inspect flood pictures in Putnam. Right, below: A new test bureau was quickly improvised after flood waters reached almost to the top of the local test desk.

fice ran on auxiliary generators until 12:16. Then water rushed into the basement and knocked out the emergency equipment.

"We were trying to get all the records and movable equipment off the floor," says Foreman of Installers Sands Fish. "Then there was a rumble in the basement. The water came in with such force that it tore a partition down."

When every conceivable precaution had been taken, Mr. Cole ordered complete evacuation; the office had to be abandoned.

As several outside plant men were waiting for the last evacuees from the office, screams were heard from the furniture store next door, where three people were stranded. Without hesitation the telephone men formed a human chain through the raging waters to the store. "The lady was so scared," said a lineman, "that she held on to me with a death-like grip. She couldn't say a word."

Similar cries were heard a few minutes later from a foursome trapped in a stranded automobile a few hundred feet up the road. Again the crew formed a line, this time in even deeper and faster water. To these men, rescuing seven persons was nothing exceptional. "We only did what anyone would have done," they said.

DURING THE NEXT 24 hours, even though flood waters prohibited entry into the downtown area, telephone people were in action. Realizing the scope of the disaster, engineers and plant supervisors at the company's headquarters in New Haven formulated detailed restoration plans. Specifications were drawn and equipment was ordered so work could start as soon as it was safe to enter the building.

Meanwhile, in Putnam, mobile equipment and coin telephone booths were being installed to handle emergency calls. In less than six hours, the Putnam-to-Danielson toll cable was tapped and working circuits were connected to emergency public telephones. The Day Kimball Hospital, across the river from the center of town, was served by mobile radiotelephone equipment by nightfall.

As a precautionary measure, a nine-position No. 10 switchboard, in moth balls for several years, was shipped to Putnam. To house this manual office, blueprints for a second-story addition were made, contractors were hired, lumber was purchased, and operators were recruited.

In an effort to save the dial equipment, our engineers advised that it be hosed down, blown out with compressed air, and finally dried with infra-red lamps, fans, and heaters. This, they had learned from Bell System experience in other floods, was about the only way to salvage equipment so badly covered by mud and silt that it was hardly recognizable.

Over night, Putnam became a major center of telephone operations, as people from all departments converged on the small city. Supplies and equipment of all kinds were shipped in on emergency schedules; some were flown in from Western Electric plants as far west as Lincoln, Nebraska.

With these same supply trucks came food, water, and medical supplies. Company Nurse Dorothy Schmidt from New Haven inoculated 200 people against typhoid. Other shots were given for tetanus. With the city's entire water supply polluted, water was shipped in, gallons upon gallons. Food, too, was a scarce item.

Plant Health Counselor William Nicoll had the Herculean task of finding rooms for about 150 people. "That, in itself, was a full-time job. We had to rent complete tourist homes, motels, and hotels. We even used several private homes," he reports.

By Saturday noon, flood waters, which rose four and one-half feet in the switch room, had receded enough so it was possible to enter the building from a Coast Guard boat. Foreman of Central Office Repairmen Lester Stradley, the first through a window, said, "I was just flabbergasted when I put my foot through that window. It got stuck in the mud. I had imagined a mess, but nothing like this."

WATER WAS STILL knee-high in the building when the East Putnam Volunteer Fire Department began pumping fresh water from a 2,700-gallon tank into the office to hose down the muddy switches. A Putnam central office repairman reported, "wood, paper and all kinds of other junk were floating around us."

Later on this hot, sunny afternoon, house service men and contractors were shoveling out tons of mud and silt; construction crews were setting poles; and work was progressing on the new manual office. A new business office had already been set up at the former telephone building on higher ground. The present owner of the building told local Manager William Johnson, "Take it over whenever you want. We'll worry about the rent later."

Before the day was out, Putnam had operators for the first time in four years. A two-position manual PBX was connected to the Danielson toll cable so fifty important organizations and individuals could have emergency service. Miss Ruth Shaw, assistant chief operator in Danielson, assumed her former role of Putnam chief operator. Traffic headquarters were in the rear of the "new" business office.

Meanwhile, the Danielson switchboards, manned to their capacity since the flood struck, were swamped with calls. Officials transacted pressing business, and calls to loved ones spread good—and bad—news.

Commercial sales people had already visited business customers whose premises were badly damaged. When the condition of customers' premises would not permit restoring service for several days, they were offered, without charge, a central answering service for calls coming in to their telephone numbers. PBX installers and repairmen were also working long hours helping to speed industry's recovery by prompt restoration of service.

Work at the central office had to be halted abruptly about 8 p.m. Saturday when it was feared that an upstream dam might give way. By daybreak Sunday, however, operations were resumed.

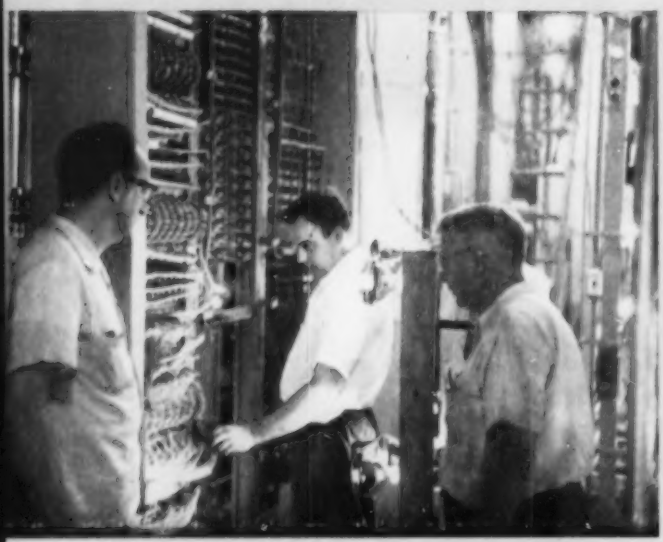
WHAT TRANSPIRED in those daylight hours of Sunday was almost unbelievable. By sunset one could walk through most of the first floor of the telephone office without boots; the new second story had part of its roof; adequate emergency service was available to Putnam citizens; and the long, hot, tedious task of drying out the step-by-step dial equipment was well under way. New business office records had been prepared by a group of directory and other headquarters people from the accounting records in New Haven. Since cables carried on and under bridges had been severed by the flood waters, a 1,200-pair aerial cable was placed above the river to join once again the East and West sides of Putnam.

In the telephone office, infra-red lamps, fans and heaters, ladies' hair dryers, and air compressors—all powered by auxiliary generators—were used. Splicers' manhole heaters and blowers provided an additional source of heat at a time when the mercury outside was over 90. The office

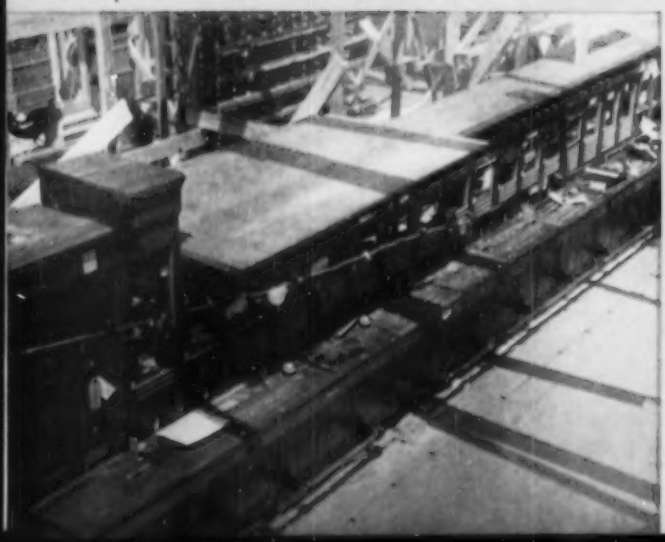
The East Putnam Volunteer Fire Department supplied fresh water to hose down the central office equipment.

Left, below: Hosing operations were begun while flood waters were still knee deep in the switch-room. Right, below: Hair dryers proved very effective in drying out step-by-step equipment.

Emergency generators were rushed in to provide power for the telephone office.



Infra-red lamps were used to dry switches while Western Electric men installed new equipment.



Opposite: The day after the flood, work was started on a second story to house a nine-position manual switchboard—which soon proved unnecessary because of the swift restoration of the dial equipment. Left: Even before its protective housing was completed, the switchboard was in place on the roof of the office.

presented a picture of mass confusion, yet each man knew his job. Both inside and outside plant forces worked around the clock on 12-hour shifts.

In the days after the flood, Manager Johnson visited many public officials, business men, and prominent citizens to see if they had any special telephone needs. "When they had any reasonable request we certainly tried our best to fill it," he reported. "Unless it was really essential, we couldn't tell them when they were going to get service. We ourselves didn't know. But everyone was appreciative of our problems."

Monday night, a ray of optimism spread over the telephone family. Work was progressing so well on drying the dial equipment that it was thought partial service would be restored within 24 hours. At least, that's what they hoped.

Their hopes were not in vain. At 4:19 Tuesday afternoon General Plant Supervisor Edward Pilotti dialed WAlnut 8-6643, a number picked at random, and got Mrs. Mary Mountford; the first local dial call in 100 hours was put through. From then on it was just a matter of cutting in equipment piece by piece. That is, almost all phones were put back in service. Several hundred couldn't be reconnected because customers' premises were no longer there.

With dial service expanding hourly, work still proceeded on the installation of the manual office. The second floor addition was finished—complete with wash rooms—while Western Electric installers were putting the final touches on wiring the nine-position manual board. This, Southern New England engineers thought, could be taken down as a unit and stored away against another disaster. Next time, they thought it could be installed in a matter of hours. General Equipment Engineer Herbert Sundius says, "If we're going to keep on having these fights with nature, we'll be even better prepared."

Civic officials, newspapers, and the man on the street all had high praise for the speedy restoration work. Telephone employees had similar comments for Putnam folks, too: for all the individuals and organizations who went out of their way to help.

The telephone job was completed. But the job of rebuilding the city of Putnam is still being done. About 2,000 were left homeless, 3,000 thrown out of jobs, and countless others left without a penny. But Putnam residents are confident of the future. In the words of Mayor John N. Dempsey, "Don't worry about us. We'll be back."

Supplementing the preceding articles, this account of hurricane and flood damage in eastern states last August again shows the Bell System prepared to meet every test

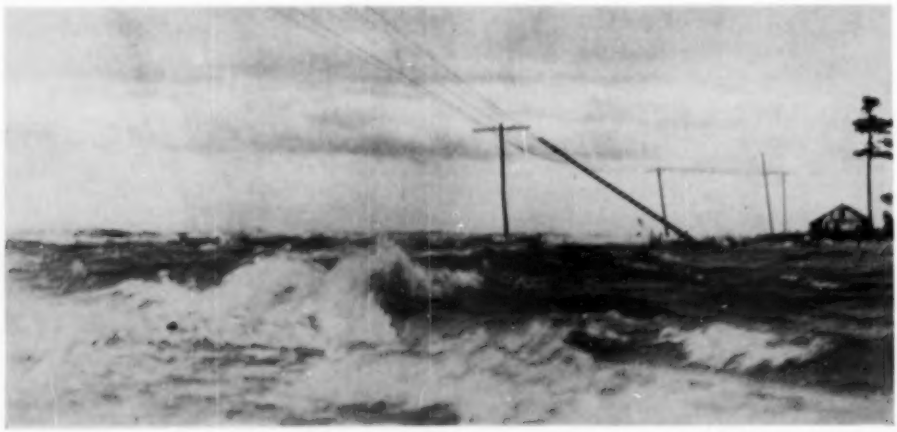
CONNIE, DIANE, AND JUPITER PLUVIUS

JOHN H. MITCHELL

PLANT DIVISION, O. & E. DEPARTMENT, A. T. & T. CO.

SOFTENING UP, DIVERSIONARY ACTION, SURPRISE ATTACK make up a military formula for invasion. Three meteorological monsters used this formula to assault the Northeast last August. "Connie," one of two hurricanes, dealt the first blow—a softening-up job with hammering winds and pounding rain. Hurricane "Diane" moved in right behind, hit the beaches, stormed inland, then suddenly stalled her drive. This diversionary action signaled the third phase—surprise attack. Miles away, "Jupiter Pluvius" let go with the crusher—tons and tons of demolishing water on unsuspecting targets.

Their toll was heavy: over 200 persons dead, over one and a half billion dollars' worth of property damage—and nearly half a million telephones. While thousands



Telephone poles and wires stand staunch as Hurricane Connie smites the mainland.

Flood's Toll

Statistics reveal nothing about suffering and heartbreak. They include no percentages for the shock of seeing one's life accomplishment whirled away by a destructive torrent, nor for the discouragement of having to start building afresh a structure which had once seemed to hold security secure. But some representative figures may help to convey the extent of the catastrophe which assailed northeastern United States last August.

Red Cross reports show 1,326 homes destroyed, 4,808 with major damage, and 14,578 with lesser damage.

More than 200 large factories in the flood area were closed, at least temporarily. The brass and copper manufacturing centers of New England were so badly hit that 30 per cent of the nation's total brass mill capacity was put out of production for two to three months.

The floods passed without any serious outbreak of disease. But in many places people had to boil their drinking water for days, and contaminated food and drugs in commercial channels, with a value of some $17,500,000, had to be destroyed.

Necessary road repairs in six states were estimated to total $97,500,000. Federal funds of nearly a billion dollars were made available to help rebuild the flood-battered areas, and unofficial estimates were that $100,000,000 will be required for the repair and rehabilitation of public facilities.

As of September 1, the Defense Department's Corps of Engineers was engaged in repair work in 52 towns, and expected the total to reach 99. Lieut. Gen. Samuel D. Sturgis, Chief of Engineers, estimated flood damage at above one and a half billion dollars, and he called the rehabilitation job "one of the biggest and toughest since Noah."

This summary of bold facts is from information supplied by the Federal Civil Defense Administration, which coordinated a disaster program to which all departments of the government contributed.

struggled to recover from the wreckage, telephone people worked another restoration marvel. They accomplished their task in a matter of days, just as they had done during last autumn's three hurricanes. Once again the Bell System met disaster well armed. Its normal state of preparedness assured rugged plant, swift supply, and skilled people. Last minute preparations assured that these resources were fully mobilized.

Connie

IT WAS DURING the week-end of August 7 that telephone people began hearing reports of Connie, the first hurricane of the season to threaten the mainland. Warily they watched her, for last year's experience had been bitter. They studied Weather Bureau bulletins and tracked her course for several days. She had incubated in the West Indies, as do all tropical storms, hatched into a hurricane and, christened Connie, churned her way northward, passing well east of Puerto Rico.

Telephone people readied their reserves, alerted forces, checked supplies, activated control centers. In New York, the A. T. & T. emergency center opened to begin a day and night vigil awaiting Connie's decisive move. On Friday, August 12, it came. In mid-morning Connie with her 100 MPH winds banged into Morehead City, North Carolina, then swept over Norfolk, up the Chesapeake Bay into and through the heart of Pennsylvania. Friday she emptied herself over Northern Pennsylvania and upstate New York, backwashing New Jersey, New York City, and Long Island on her way.

Her destruction was not so great as last year's, but this was little comfort to those

Many circuits were lost when this bridge over the Delaware River between Phillipsburg, N. J., and Easton, Pa., was wrecked by the angry flood.

These cables near Norfolk, Conn., continue in service although the highway couldn't take it.

A new pole goes up beside the Quinebaug River in Putnam.

on the beaches. Cottages, piers, bridges, docks just shortly reclaimed there, were dashed to pieces, and so it was with poles and cable. Winds and their special victims, trees, snarled telephone plant into disorder in North Carolina, Virginia, and Maryland. The 6000 telephones lost by the Southern Bell Telephone and Telegraph Company do not tell the full story in North Carolina, because the area raked most fiercely by Connie is largely served by an Independent telephone company. A better measure of the whiplash winds would be the 16,000 telephones knocked out in Virginia, the 5000 in Washington, D. C., and the 35,000 in Maryland.

By far the greatest cause of service disruption was the interplay of water and wind on trees. Rain softened their footing, then wind toppled them into cables. Six to ten inches of rain deluged Pennsylvania: 44,000 telephones were out there, and 19,000 in upstate New York. But even as this was happening, the first of 71,000 telephones were being disabled in New Jersey, 37,000 in Long Island, and 8,000 surrounding New York City, where heavy rain clouds already positioned there jettisoned tons of rain as Connie's approach gave the signal.

Telephone men with trucks and supplies moved in right behind the storm to size up and get at their job. Poles, wire, cable, hardware—all that was needed to get started—was on hand waiting in storerooms for just such emergencies. Long before these ran out, Western Electric shipped more in. By Monday night, just three days following Connie's charge inland, all restoration, if not the final clean-up, was completed and service once again normal. And all but a few of the disrupted toll circuits were again in use Sunday.

When it was all over, 241,000 telephone stations had fallen to the violence of wind and rain in states served by the Southern Bell Telephone and Telegraph Company, The Chesapeake and Potomac Telephone Companies, The Bell Telephone Company of Pennsylvania, The New Jersey Bell Telephone Company and the New York Telephone Company. The cost of returning these telephones to service slightly exceeded two million dollars.

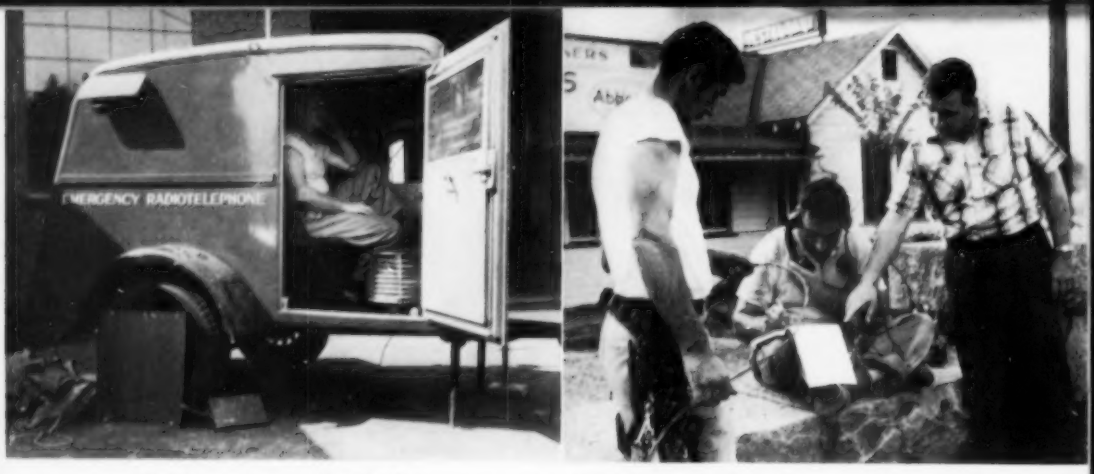
Diane

Those in the field splicing cable, stringing wire, running strand were too busy to worry about what the weather held for tomorrow. But those in report centers weighing the damage counts and recording the rapid restoration progress kept one eye cocked toward later Weather Bureau bulletins. Diane, another hurricane first making print on Friday, was not steering the northeastward course to sea as meteorologists thought she would. Rather she chose to follow her older sister and headed landward—toward the battered Carolinas. Again telephone people prepared—and waited.

Wednesday morning, August 17, she struck—at Wilmington, North Carolina, shortly after 6:00 A.M., not far from where Connie entered just five days earlier. This was just about where Hazel had blasted her way in last October. Diane then turned northward, and by nightfall sputtered into central Virginia. The 100-MPH winds which she brought ashore quickly lost momentum. As she moved over Danville toward Lynchburg, her eye flattened and was difficult to find. Heavy rain and confused wind seemed all that was left of a once mighty and fearsome hurricane. Miraculously, damage proved light. Southern Bell counted only 3500 stations out—

Helicopters played an important role in emergency operations. Above: The rope being payed out over Brodhead Creek is the first step in bridging the torrent with emergency cable. Center: Rope is being loaded aboard a 'copter. Bottom: These cablemen are being flown across the creek to East Stroudsburg.

Operators everywhere rallied to the point of need. Top: Cots were set up to enable traffic personnel to stay on the job during the emergency. Center: Out of town operators are welcomed at Easton, Pa. Bottom: These traffic people got to their jobs in Springfield, Mass., in an Army amphibious vehicle.



Left: Emergency radio telephones were put to immediate use to provide essential service temporarily. Right: A circuit was set up in a hurry beside Brodhead Creek for Civil Defense.

though once again the hurricane centered through Independent territory.

Early the following morning at New York City, the A. T. & T. emergency center began its job of preparing the morning bulletin to keep headquarters groups informed. One member received the report from Virginia: only 6000 stations out. Another ran through the weather bulletins. The 11:00 P.M. bulletin, issued the night before by the Washington Weather Bureau, was the important one. Summarizing it in his mind, these comments stood out—*Diane centered around Lynchburg at 11:00 P.M. EST—moving generally northward 13 MPH, failing, weakening—winds average below 35 MPH—indications are it will continue to fail and weaken—moderate to heavy rains likely to spread into central Pennsylvania—the only serious danger now is from heavy rains and flooding—this will be the final bulletin on this storm.*

Morning newscasts confirmed the prediction. Diane was all but through, as a hurricane; and her worst had not been very bad. Members of the emergency crew put together the words of their bulletin, ending with a most ironical sentence—"In view of the fact that Plant damage is not of emergency proportions and no further damage is expected, this is the last report on Diane."

A great relief settled over the entire East Coast. For telephone people, restoration of the 9500 telephones to service would be little more than routine. Storm and report centers could close up shop; those who manned them could return to their normal jobs. After days of blustering threats, Diane's visit was brief and by comparison easily reckoned with. Little did anyone suspect she had taken a rain check.

Jupiter Pluvius

THAT EVENING, still Thursday, heavy rain poured down on several Northeastern States. A month earlier, inhabitants would have welcomed such a rain, since July had been one of the hottest, dryest months in history. But the near-record rainfall of the past week was more than enough to revive lawns and crops that survived the drought. This was generally true of the entire Northeast, where prolonged drought was suddenly changed to spongey saturation. To most people, that evening, the deluge seemed little more than ill-timed.

Next morning brought first word of floods. Diane's dying winds had sucked in a sodden mass of air hanging over the Atlantic and channeled it skyward toward

upper cold strata. There the warm moisture precipitated, and fell seemingly not as rain but as rivers of water.

Companies were canvassed early. The Pennsylvania Company reported 15,000 stations out; New Jersey 8,000; Southern New England 24,000; New England 12,000; New York normal. Since 60,000 outages spread among so many companies is not of disastrous proportions, and the pitiful plight of the devastated communities was not yet suspected, the early morning reports fell far short of indicating the seriousness of conditions or the restoration difficulties.

During the day these figures climbed. More details of flooded central offices came in from Connecticut. Yet the tragic extent was still unrealized—for where the powerful waters raged, they paralyzed the means by which they could be described to others. Photographs and stories now trickling in from stricken regions soon gave the first sense of disaster. Later that night, broadcasts characterized the disaster as the worst flood in the history of the Northeast. Surely in the midst of such destruction telephone damage must exceed the 75,000 stations last reported as out. It did.

Saturday's news described horrors. Never had the eastern states been stunned by such destruction spread over so many heavily populated districts. And all so suddenly. Many localities told the same story. Record rainfall, as much as 18 inches, fell in just a few hours on ground already super-saturated with the past week's deluge. Water striking the hillsides cascaded down the surface to the little streams. These streams turned into torrents and hurtled into rivers—building powerful walls of water. The rivers leaped their banks and filled the valleys. And where the valleys were too small to scatter the stampeding water, walls of it funneled through, battering and sweeping everything with it.

In Pennsylvania, near Stroudsburg, Brodhead Creek rose 30 feet in a matter of minutes. Its raging current flushed out nearly all that man had built; here the greatest single tragedy of the floods obliterated every vestige of Camp Davis and 38 of its summer inhabitants. Several miles downstream, the onrushing waves carried away bridges and all communications linking Stroudsburg with East Stroudsburg.

All along the Delaware River, from Port Jervis, N. Y., to the Philadelphia suburbs, 6 to 10 inches of rain raised flood crests which engulfed the lower portions of towns —towns like Milford, Dingmans Ferry, Bushkill, Easton, Yardley, and New Hope, where the opening of the Buck's County Summer Theater was washed out. Farther west, Scranton was battered by its Roaring Brook, and Tamaqua suffered from a tributary of the Schuylkill. On the New Jersey side of the Delaware, Trenton evacuated families from the highest flood levels ever seen there. A quiet little town, Branchville, withstood the impact of a six foot wall of water when the dam of a pond gave way in the early morning hours.

Connecticut Was Hardest Hit

HEAVIEST LOSSES occurred in Connecticut. The Naugatuck valley, which guides that scenic river on its way seaward, took 16 inches of rain and was turned, in a few hours' time Friday morning, into a racing, roaring swirl of timbers, bricks, rocks, trees, rubble—and death. Waterbury, Naugatuck, Seymour, and Ansonia-Derby all suffered heavily. The center of Torrington, farther up the Naugatuck, was gutted as streets, bridges, and water-front stores disintegrated. Downtown Bristol found itself under four feet of water from the Pequa-

Hurricane and Flood Damage

	1954			1955	
	August *"Carol"*	September *"Edna"*	October *"Hazel"*	August *"Connie"*	*"Diane"*
Service Interrupted					
Telephones	334,000	295,000	448,000	241,000	205,000
Restoration Forces Borrowed					
People	1,658	1,947	None from	None from	
Vehicles	900	1,100	Other Companies	Other Companies	
Estimated Restoration Costs					
Expense (Millions)	$4.5	$4.1	$4.2	$2.0	$2.0
Capital (Millions)	1.7	1.4	1.3	.2	4.0
Total	$6.2	$5.5	$5.5	$2.2	$6.0
Restoration Interval					
Days	6	5	6	3	9

buck River. The 10,000 residents of Putnam, in the northeast corner of Connecticut, watched as five feet or more of water rose to fill their town, then spent a horror-filled night as exploding magnesium plants sprayed the sky with white hot pellets. Across the state, near the Massachusetts border, Winsted's Main Street became the main channel for the erupting water of the Mad River. Here streets were gouged out, pavement shattered and tossed like wafers, leaving water, gas, sewer mains and telephone conduit stripped of cover.

The rain which fell over Massachusetts Friday—13 inches over Springfield, 11 around Worcester, and 12 in the Boston area—wrought similar destruction but in decreasing severity as it moved from the hills and valleys to flatter land.

Regardless of location, wherever water rose and rammed its way toward the sea, it swept away homes, kicked aside bridges, undercut highways, and plundered the countryside. Estimates place the property damage at $1.6 billion—the human loss more than 200 lives.

Flood Damage in Six States

INEVITABLY, TELEPHONE PLANT went too. Service to 17,000 telephones was swept away in the upper Delaware-Stroudsburg area as dislocated poles and bridges carried cables with them. In and around Scranton, 6000 were lost when the Cedar Avenue bridge lost footing. Nearby, Roaring Brook washed out desperately needed circuits to Stroudsburg. Altogether, the Bell Telephone Company of Pennsylvania counted 34,000 stations out. New Jersey Bell's total was 19,500. This includes Phillipsburg's 10,500 telephones which were cut off from their central office in Easton when the Easton-Phillipsburg bridge buckled into the Delaware.

Flooding of basement power plants in two Connecticut central offices— Winsted and Bristol—snuffed out 25,000. Seymour's 4000 were briefly disabled when civil authorities ordered the town evacuated during a particularly threatening period. Although station outage in Torrington was not so severe, all of its cables leading to the outside lay flooded in the center of town. Water whirled five feet deep around the Putnam central office dial equipment which served 7000 telephones. Southern New England's loss was 82,500, slightly under 10 per cent of its total.

In the territory of the New England Telephone and Telegraph Company 60,000

telephones succumbed, 25,000 in the Springfield area, 8000 in Worcester and vicinity, 23,000 around Boston and 4000 in Rhode Island. Altogether, flood waters disrupted service to 196,000 telephones.

By comparison, the number of long distance circuits washed out seemed small. Some of these were long haul and readily rerouted over other facilities, but many were interconnecting links between nearby communities. Loss of these left a number of communities without communication to the outside, but within a few hours emergency lines reunited most of them.

Although telephone damage was not as great in numbers as it was during earlier full-scale hurricanes, its effect was more serious and restoration far more difficult. Trouble was concentrated, not scattered. And this time trouble plagued the central office as well as the pole line. The job of maintaining communications was tremendous. The job that Bell System men and women did was equally tremendous. Operators, including many on vacation and former employees who volunteered their skills, rallied around their switchboards. Once there they stuck by doggedly, bucking the odds against moving many times the number of calls through a fraction of the number of circuits. But the most urgent went through. Commercial people arranged for and coordinated emergency service to hospitals, relief centers, disaster headquarters, civil agencies. They manned mobile telephones and public booths hurriedly moved in to re-establish communications with stricken communities.

The heavy construction needed to get plant back on its feet took the combined ingenuity of the Plant, Engineering and Western Electric installation forces. The immediate goal was to make it work—permanent reconstruction could wait. Emergency circuits came first. Radio, sections of undamaged cable, twist, anything that

Vigil at A. T. & T.'s emergency center in New York City.

could be improvised into carrying speech bridged the gap until more and better were made available. Three central offices made lifeless when power plants failed in flooded basements demanded instant attention. (Commercial power failed to some 70 central offices whose batteries maintained uninterrupted service until emergency generators, either permanently installed or hauled in, picked up the load.) One of the first trucks to get through to Winsted carried a new diesel-generator which was hastily set up in the back yard. In Pennsylvania, emergency generators literally flew in—by helicopter—to the Bushkill and Cresco offices before their battery reserves ran out. The restoration masterpiece which took place at Putnam, Connecticut, is described on previous pages.

On the outside every conceivable means was used to tie cables together again. Helicopters carried the first lines across Brodhead Creek and Farmington River, both still too enraged to allow any other means of crossing. In at least three places the Coast Guard, using line-throwing equipment, shot lines across the Naugatuck River. On the battered Phillipsburg-Easton bridge, Pennsylvania, New Jersey, and Long Lines construction forces feverishly spliced new wire to old in spanning the gap left by collapse of the bridge and the nine cables on it.

What they accomplished was incredible: the speed with which they did it was even more so. By Sunday noon, just two days later, there was service of some kind into all areas served by the Bell System. By Wednesday night, six days later, service was again normal everywhere but the hard hit sections of Connecticut. At the end of the ninth day, service was back to virtually all users save those no longer there. And long before houses are repaired, highways repaved, or bridges rebuilt, telephone plant will stand once again tidy and trim.

The Test of Preparedness

FIVE TIMES within less than one year's span, Bell Companies have matched stamina against hurricane's disaster. Five times they have bounced back swiftly. Their people, skilled and with purpose, joined as one in the giant tasks of recovery—while many more in neighboring companies stood ready to add their might as they did last Fall. Materials flowed in abundantly, for the Western Electric supply pipe seemed never to run dry. Organization, line and staff, gave orderly direction. And financial strength—initial flood restoration cost six million dollars—assured that each was in ample supply.

But with Diane came a special test—one of preparedness. While hurricanes approach there is time to muster resources. The floods triggered by Diane exploded without warning and brought a different type of damage. There was no time for special preparations. Telephone plant had to rely on its ruggedness, people on their everyday skills, organization and supply on its everyday state of preparedness. Once again, the Bell System proved itself prepared, inherently, for any emergency any time.

An experiment by a group of Bell System companies at the University of Pennsylvania seeks in an Institute of Humanistic Studies an answer to this question:

HOW CAN WE BROADEN THE TELEPHONE MAN'S HORIZON?

JOHN MARKLE II

Vice President, Personnel, THE BELL TELEPHONE COMPANY OF PENNSYLVANIA

How does an appreciation of Beethoven's Ninth Symphony help a telephone man to do his job better?

Why is it that another man who has a comprehension of what James Joyce is trying to say in "Ulysses" can make a greater contribution to the Bell System than if he knew nothing about this detailed study of life in a modern city?

What bearing does a course on the "Philosophy of Ethics" have on the ability to give better telephone communication to the public?

Ask these questions of any Bell System executive ten or even five years ago and he would have looked at you in amazement, and then probably have told you to leave the music to the musicians, the ethics to the philosophers, literature to the professors, but kindly keep the telephone business out of any of them and let those who know it run it. If extra study is needed, he'd say, let it be along the lines of engineering and whatever subjects directly relate to the job; but certainly such unrelated studies have no relationship to job performance.

Now, if this were the usual type of magazine article, the next few paragraphs would tell you exactly how wrong this old-timer is in doubting that non-related subjects can help a telephone man. But since this is the story of an experiment, the end of which is not yet, nor may be for at least ten more years, there is no such cut-and-dried answer.

For the past two years, a group of Bell System companies have been operating at the University of Pennsylvania a program entitled the "Institute of Humanistic Studies for Executives." It involves the exposure of a few men from the middle management group of the companies to a 10-month program in the Humanities; and at this point, all that can be said is that we think we're headed in the right general direction.

It should be stated at the outset that the Institute was not set up to help along the cause of the Humanities or Liberal Arts,

A seminar on "World Organization" in the Institute of Humanistic Studies for Executives is conducted by Dr. Philip E. Jacob (far end of table), professor of political science at the University of Pennsylvania. Students are members of the Class of 1955.

however deserving, nor was it aimed at making dilettantes out of business men. The program was treated like any other business decision; that is, a particular approach was applied to a current problem in management development because it was felt that the money would be wisely spent and, in due time, pay off.

A comparison could be made to almost any product or service. Lawyers do not exist because a group of eager young men want to study law and it gives them something to do which will support them, but rather they exist because there is a need for their services. As another example, we all know what's good for babies—milk, orange juice, vegetables, and so on. These things they must have to grow into husky boys and girls. But pediatricians do not prescribe these foods to help the dairymen or the orange growers or the farmers, but rather because these nutrients are good for babies. We think the Humanities will help us solve a problem, and so we are using them—but not because they are a fine thing to study in themselves.

WHAT IS THIS "PROBLEM" in management development? It is so closely integrated with our modern life that it cannot be stated in one sentence. Business in America has been growing at a prodigious rate. As it grew larger, it was broken down into functional units called departments and, with the growth of staffs, business really became complex. This meant greater and greater specialization by individuals, who tended to concentrate on the particular area of knowledge in which they had become expert.

Another facet of the problem of specialization can be seen in what has been happening in the colleges in recent years.

A little over a year ago, I met with a group of deans from the larger universities and colleges in Pennsylvania and Delaware. We were discussing the problem of developing broad-minded men for exec-

utive positions in business. Nobody disagreed with this objective. They said, in effect, "You're not telling us anything new; we hear this all the time, and it's great. But along with spring comes the typical recruiter, hot on the trail of college graduates. Do they ask us for broad-minded men? Oh no—what each one of them wants is a senior who is a chemical engineer specializing in hydrocarbons, or maybe an accounting major with experience in statistics. We simply try to supply the demand."

No wonder this typical bewilderment among educators is prevalent; and I believe that this overspecialization in the colleges is the result of trying to meet a demand by business, rather than the idea of the educators. The world has been traveling down the road of specialization ever since the end of the first World War, and now the colleges are trying to counterbalance it by giving their students wider horizons through the Humanities or Liberal Arts.

With a background of many years of specialization both in the colleges and in business, how then do we train men for policy-making positions? They have been spending their careers in lower or middle management jobs where their responsibil-

Watching Dr. Carleton S. Coon make a reconstruction of a Neanderthal head in the University Museum are members of the Class of 1955. The student at the right holds a skull reproduction being used as a model by Dr. Coon—famed anthropologist who is a lecturer in the Institute.

ities were primarily for production or sales or the other day-to-day operations of the business. Even if they have been graduated from a good Liberal Arts course, the internal competition in the business will motivate ambitious youngsters to devote their time to reading technical books and learning the mechanics of the industry. Thus it follows that, except in rare cases, they cannot keep up with the outside world. In addition, the functionalization of most businesses has tended towards the development of specialists.

In an article in *Fortune*, John L. McCaffrey, president of the International Harvester Company, said:

". . . . . the world of the specialist is a narrow one and it tends to produce narrow human beings. The specialist usually does not see over-all effects on the business and so tends to judge good and evil, right and wrong, by the sole standard of his own specialty."

And President Crawford H. Greenewalt of duPont wrote:

"Today, specific skill in any given field becomes less and less important as the executive advances through successive levels of responsibility."

THE SECOND PART of the problem is the change which has taken place in the world about us. Within the past twenty-five years there has been a social revolution. The emphasis has been on human things and social reform. We either have solved or know how to approach most of our technical difficulties. On the other hand, the really perplexing problems that we face today and will continue to face in the future are in the field of human relations. Since man is about the same as he has always been, and nobody can point to any appreciable change in 8,000 years, doesn't this raise the question as to whether a specialized educational background, with further specialization in business, properly fits men to provide the kind of leadership necessary to cope with the new problems of top management? With the United States taking the leadership in world affairs, won't this have a marked effect on business?

Clarence Randall, chairman of the board of Inland Steel Company and head of the President's Tariff Commission, in a recent issue of *Life*, discussing the need for business men to participate in Government, said, in part:

"I am afraid that preoccupation with self is the Achilles' heel of the free enterprise system. That regime stands as the miracle of the modern world for having brought the greatest good to the greatest number of any system of industrial organization yet conceived by man, but should it ever disappear, it will have destroyed itself through this cause. Men grasp its privileges without accepting its responsibilities. They crop the fields of our way of life without restoring the soil. Many live all their lives outside the zone of responsibility in their country."

Looking back, we see that our predecessors were concerned mainly with production, sales, finance, and technological advancement. Their problems were centered mostly within the business itself. Today, in addition to these matters, we feel the effect of the increasing influence of social, political, and economic changes which have taken place, and a business now has to consider itself in relation to the community, to the nation, and to the world—as well as its position within its industry. We read of some companies making decisions based upon a long-range view of their positions in society. This may involve financial contributions to charitable institutions, promotion of better schools in their communities, assuming leadership in helping to solve governmental or civic problems, and

even acting as an important adviser to rulers of undeveloped countries in which they are operating. How well these tasks are performed will have an important effect upon the future of our civilization, which is to a large extent based upon business.

Looking ahead, it seems to us that our successors are in for even more difficult times, and consequently must be better prepared than we have been.

As Frederick E. Pamp, Jr., of the American Management Association, said in a recent article in the *Harvard Business Review:*

"The first question a company must now begin to ask of its candidates for executive responsibility is: 'What can you do that a computer can't?' "

Thus we see the problem as "How can we develop future higher management people?" A generation ago, business leadership called for "knowing the business." Today, and especially tomorrow, it calls, in addition, for "knowing mankind." Thus we see the significance of the question, "How can we get an executive to realize that, if he picks up the morning paper and sees that Prime Minister Nehru of India has made a speech with an anti-American bias, it may well have repercussions on his business two years from now?"

A FUNDAMENTAL OF TRAINING is that the development of an individual is his own responsibility and he must accept the responsibility for his own education. However, the company can assist the individual

Sir Jacob Epstein's sculptural group, "Social Consciousness," in Philadelphia's Fairmount Park, is viewed appraisingly by one of those attending the Institute.

in many ways, either by calling his attention to worthwhile opportunities or by making it possible, through time off the job or financial participation, to have these things available. For many years, we have had training courses of numerous kinds, both technical and non-technical. We also send people, depending upon their individual needs, to various University courses for business men and to courses or conferences conducted by other groups outside the business. But none of these quite answers the problem.

What was wanted was some kind of program that would sharpen the individual's creative insight, widen his frame of reference to many fields of human behavior, and provide him with some techniques with which he could test the logic and consistency of his own thinking.

When a business gets a technical problem, it frequently turns to the universities—but it almost never seeks academic aid in solving problems of human affairs. In spite of this, in 1952, at the suggestion of Bartlett T. Miller, vice president of the American Telephone and Telegraph Company, the officers of The Bell Telephone Company of Pennsylvania asked the University of Pennsylvania what it could offer to meet this need. They also consulted with others having long experience in business and education who had developed broad viewpoints in their respective fields.

Harold E. Stassen, then president of the University of Pennsylvania (now special assistant to President Eisenhower for Disarmament), went to work on the job; and his successor, Dr. Gaylord P. Harnwell, has continued a keen interest in the project. After much struggling and many conferences, a proposed curriculum for a new educational program was developed. In the face of some valued advice to the contrary, it was decided not to include any *applied* business studies in the curriculum, since there are already excellent courses available at many universities. If this was to be a new program, it would be one that could not be had elsewhere. And if the aim was to broaden a man's vision, then we should give him a rest from specialization.

This led us to a program in the Humanities and Social Sciences.

EVENTUALLY the Committee in charge of the Institute crystallized the various objectives which were desired:

1. To enable a potential future executive to understand and interpret the social, political and economic changes—both national and world-wide—which will influence the problems of corporate management to an increasingly greater degree in the future. This might be defined as developing a breadth of outlook, looking towards future "statesmanship" in the business.

2. To indicate the importance, impact, and use of History, Science, Philosophy, and the Arts in the world today, particularly as they influence large groups of people, such as employees, customers, and stockholders.

3. To motivate the participants in the program to accept the concept of intellectual activity as a never-ending process to be continued throughout life.

4. To balance with a humanistic background the almost complete attention generally given by younger men in the business to acquiring technical knowledge and competence as a result of working in an atmosphere of intense competition with other individuals.

5. To offset a tendency to overconformity, which is bound to occur in a business which is highly specialized and which promotes almost entirely from within the organization.

Early in the planning, the project was discussed with other Associated Compa-

nies of the Bell System, and several of them were enthusiastic about trying it experimentally. Classes began in September 1953, and the first class of 17 men from seven of the Bell companies was "graduated" in June 1954. A second class of 19, with three additional Bell companies participating, finished in 1955. The third year is about to start, with four more of the companies sending students.

The Companies represented in 1955–56 are: The Pacific and the Mountain States Telephone & Telegraph Companies, the New York and Wisconsin Telephone Companies, the Southwestern, Northwestern, Illinois, Michigan, Chesapeake & Potomac, and New Jersey Bell Telephone Companies, The Bell Telephone Company of Pennsylvania, the Western Electric Company, and the American Telephone and Telegraph Company.

Teaching methods include lectures, discussions, seminars, and field trips. Textbook readings are assigned in advance of a lecture or discussion. The books are given to the student when he leaves, and he thus has the start of a substantial library—to which, it is hoped, he will keep adding. The Institute has its own small reference library, and the students are encouraged to draw upon the University Library and other libraries in Philadelphia.

In addition to the regular work, some of the richest experiences are found outside the classroom. There are visits to the United Nations Secretariat; Philadelphia Orchestra concerts; New York, Washington and Philadelphia museums; and the many other lectures, exhibitions, and theaters which are to be found in a great metropolitan center of culture such as Philadelphia.

The over-all guidance of the Institute is the responsibility of a committee headed by the Provost of the University. On the committee, in addition to the Provost, are

Dr. W. Rex Crawford, director of the Institute of Humanistic Studies for Executives, leaving Blanchard Hall, the Institute's "home" on the University of Pennsylvania campus in Philadelphia.

two telephone representatives and four deans or professors of the University. One of the latter serves as the Director of the Institute.

The teaching staff at the Institute is drawn primarily from the faculty of the University of Pennsylvania, with important help from nearby Swarthmore and Bryn Mawr Colleges. In addition to the Institute faculty about a hundred guest lecturers from many other colleges and universities, as well as the University of Pennsylvania, are brought in to stimulate new ideas. These men are all outstanding in their particular fields and often stay on for further informal discussions with the students.

Since the primary function of the instruction is to help the mature individual to organize unfamiliar data and experiences in a meaningful and useful manner, the various course instructors and guest lecturers are urged not to present a comprehensive survey of various academic disciplines. Their task is to stimulate the student's interest in new material and new ways of thinking. As Alfred North Whitehead, the famous mathematician and philosopher, in discussing the goal of a Liberal Arts education, so aptly expressed it:

"Scraps of information have nothing to do with it. A merely well-informed man is the most useless bore on God's earth."

Throughout the course, the students are encouraged to reach their own conclusions about many new areas of knowledge.

The curriculum this year will cover 13 different courses of varying lengths, ranging from a minimum of four weeks to a maximum of 23 weeks. The over-all time is approximately ten months, from September to June, with breaks at Christmas and Easter. The subjects are grouped into four major fields: History, Science, Philosophy, and the Arts.

The students start with a tool course in *Practical Logic* and a study of *Economic History and Thought*. Other courses cover the *History and Aesthetics of Music; World Art;* a short course in *Analytical Reading* which is followed by *Comparative Literature;* and a course in *Social Science*, covering the various aspects of human behavior.

Later in the year, as some of the earlier courses terminate, come the *Philosophy of Ethics* and the *History and Meaning of Science*.

It might be noted that most of these courses cover certain individual subjects or groups of subjects. They are pretty well finished by the spring recess, and then the various areas of knowledge and ideas are brought together and related to our present-day world in the courses presented during the final weeks, which are: A detailed study of *Ulysses*, James Joyce's book about life in a modern city; a course in *Modern Architecture and City Planning;* a course in *American Civilization;* and finally one in *Political Science and International Relations*.

THE FIRST QUESTION usually is "What are the results?"

No figures are practicable. In an experiment as new as this, a great deal was learned the first year, and the second year benefited by the changes made after the initial experience. Further improvements will be made in 1955–56.

An attempt was made to evaluate parts of the program by means of certain psychological tests. In addition to testing the first and second years' groups at the beginning and again at the end of the program, they were also compared with a control group of men not taking the program but of similar ages and at the same levels of responsibility. This gave valuable information

about the curriculum and pointed the way toward some of the modifications which were made in the subsequent years. It also gave some indication that the program was headed in the right general direction. However, any testing of this kind can cover only certain restricted areas and will not give a complete answer, either as of now or, more important, as to the future.

An often-asked question is "Why should the company spend money in this way? Won't an ambitious young man think of these things and get the same information on his own?" Reflection will indicate, I am sure, that this approach is not practical. Granted that a few exceptional individuals with perhaps a Liberal Arts education might have the time, stamina, and ability to do the necessary reading and take an interest in the cultural life of the community, still, this will not meet the objectives. We are not looking for areas of learning, nor turning business men into connoisseurs of the arts. Rather, we are giving them a chance to find themselves and their places in society by a sabbatical leave, to try out their own ideas through reading and discussion with others, and to study under a guided program designed for their needs—of which they may not even be aware. Clearly, it would be impossible for an individual to do this on his own.

We believe that a man must have lived in the world and have become more mature before he can absorb and appreciate the value of the Humanities and be able to

Statue on the University of Pennsylvania campus of Benjamin Franklin arriving in Philadelphia in 1723 at the age of 17. The University claims him as its founder.

apply them. This is really an experiment in adult education. A few results, however, are known:

a. There was tremendous enthusiasm on the part of both years' participants. They tell us they have increased personal identity and self-realization. Boiled down, this means that the man knows where he is going and why he has chosen the path he has.

b. The changes in the men were apparent to those watching them. They have greater intellectual curiosity and self-confidence, and are better able to express their ideas.

c. They tell us it has made them better family men, better citizens in their communities, and better individuals.

If this is true, won't they be better telephone men?

To quote from a small part of a report made to his company by one of the first year's students:

It has caused me to re-evaluate my place in society. It has increased my interest in civic betterment and the social welfare. It has prompted a new and deeper appreciation of the privilege of being a citizen of the United States. It has produced a new love for books."

d. There were two interesting by-products which were not planned:

Members of the faculty were emphatic that they had also been educated. It was a new experience to most of them to teach active adult minds, and many of them re-evaluated their conception of business men.

The guest lecturers, prominent in many universities, were impressed by the high quality of the students and the fact that a corporation would try such an experiment.

In conclusion, let me draw one more comparison. The poet John Donne wrote in 1624, in one of his meditations, that "No man is an Iland, intire of itself; every man is a peece of the Continent, a part of the Maine." The concept of wholeness, as applied to physical, intellectual, and spiritual health and well-being, has gradually become accepted by enlightened people. During the early days of World War II, many of us still felt safe from enemy bombs, due to our protecting oceans. We knew that, while an air-raid on our country was possible, it was improbable. The dramatic ending of that war with the atom bomb, and the later development of the hydrogen bomb, have forever destroyed any sense of immunity from enemy action.

"All are but parts of one stupendous whole, whose body nature is, and God the soul."

(ALEXANDER POPE—*Essay on Man*)

TODAY'S WORLD stands in desperate need of men with wide horizons and breadth of vision. Certainly the need for whole men as executives—men who are more than technical experts—is universally felt. By the development of such men, the public which we serve will benefit in the years to come.

Most Americans believe that our country achieved its greatness because we developed a business civilization which produced the highest standard of living ever attained. The future of this civilization depends, therefore, upon the re-establishment and continuance of a high level of leadership. This being the case, don't we have to train the next generation to be able to cope with the social as well as the usual business problems? Don't we have to motivate them to assume such responsibilities?

This is an experiment in that direction. It may or or may not be the final answer—but certainly it seems to be a good beginning.

A guest editorial

DREAMS WITH A PURPOSE

HENRY T. KILLINGSWORTH

Vice President IN CHARGE OF THE LONG LINES DEPARTMENT, A. T. & T. CO.

"AMERICANS of the period between the 1850's and the 1950's were among civilization's most practical dreamers. And they took their own miracles for granted."

This could be the thesis of a chapter in a yet-to-be-written history of America. The historian might develop his topic by using the telephone business as an example. For here is an enterprise which, through imagination practically applied, has fostered growth and prosperity in our country.

Americans have been "practical dreamers"? Is this a contradiction in terms? A good case for using the words together is found in telephone history. Over and over again, through the years, people associated with this business have had dreams with a purpose and have seen their dreams come true.

When his invention only carried words which were mostly unintelligible over distances which were measurable in feet, Alexander Graham Bell had the vision of some day "talking by telegraph" from one end of the country to the other.

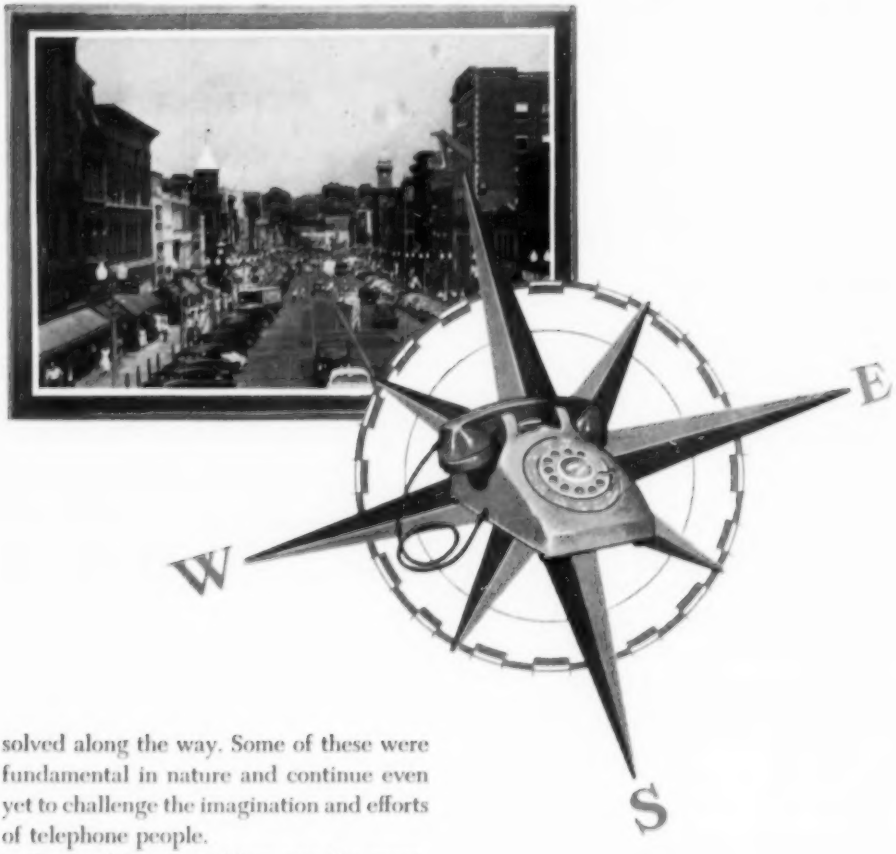
But this was not enough. In 1885, just a few years later, the founders of American Telephone and Telegraph Company * in their certificate of incorporation declared that its lines would connect every place in the United States, Canada, and Mexico with every other place in those countries—and added in prophetic manner "and also by cable and other appropriate means with the rest of the known world as may hereinafter become necessary or desirable. . . ."

Here was a telephone passport to all places on the earth though the telephone itself was yet but in its infancy.

Fifty years later—just a moment in the course of history—a telephone conversation had girdled the earth and regular service between the United States and countries lying beyond the seas had become commonplace. Connections with most of "the rest of the known world" followed swiftly. And a dream with a purpose was converted into a fact accomplished.

BETWEEN THE DREAM and its fulfillment there were many people—individuals and groups—whose efforts were necessary to transform the vision into reality. Ideas were translated into achievements through the persistent and skillful application of human knowledge. Many riddles had to be

* Before its merger with the American Bell Telephone Company in 1900, the American Telephone and Telegraph Company was sometimes referred to as the Long Distance Company. After the merger, the functions theretofore handled by the A. T. & T. Co. were assigned to the "Long Distance Lines Department" of A. T. & T., now known as the Long Lines Department.



solved along the way. Some of these were fundamental in nature and continue even yet to challenge the imagination and efforts of telephone people.

One such basic problem was the provision of connections between every telephone and every other telephone. Until it was met, at least in rudimentary fashion, growth of the service was held in check. To connect as few as ten telephones with each other by direct lines called for forty-five lines. Twenty telephones required 190 lines. Some method of central switching had to be found. Switchboards were the answer.

Improvements in the technique of switching continue to be made and the end is not yet. Soon it will be possible for every telephone user to make his own connection with any other telephone.

Riddles in the field of transmission also have been encountered and solved. Here, perhaps more than in other fields, advancement of telephony has depended upon dreams with a purpose. Less than eighty years ago the conquest of distance by the human voice seemed to be in the realm of fantasy. But men of tremendous faith and technical skill set about extending the capacity and range of telephone circuits so that they would carry more and more voice signals with ever greater clarity over ever greater distances.

As transmission improvements came, telephone service moved out across the

land. By 1915, a telephone line had made its way across the continent. Less than a year later, telephone engineers succeeded in transmitting speech across the Atlantic by radio. In another decade, radiotelephone service was inaugurated between New York and London. This was a major milestone in the progress toward the world-wide communication by voice envisioned by the founders of the business.

As if to etch in the corners of the dream, telephone cables are now being laid across the North Atlantic; others will soon reach Alaska; and still others to Hawaii are on the planning boards.

THE PREDICTION OF THE FOUNDERS was amazingly correct, but it is too much to think that even those far-visioned persons could have known of the variety of business and social communication services that were to follow, or of the technical miracles which have brought all this about. Surely they would be puzzled upon hearing such terms as carrier current, coaxial cable, radio relay, automatic message accounting, crossbar tandems, television networks; or references to such queer sounding devices as "Nike."

Yes, that first generation of telephone people almost certainly would be impressed by the marvels that have come to pass. No doubt they would be moved more by today's wonders than are we. It is characteristic of Americans to accept as common-place the most fantastic scientific developments. Through sheer familiarity with the miracles of communication, we take them for granted. The demands of the every-day job prevent us from taking a panoramic view of our achievements as they influence the life of the nation.

It would be good for each of us to pause for inspiration once in a while. We need but look about us, note the endless ways in which business and social activities depend upon telecommunications, then try to picture America without these services.

Telephone men and women may take for granted the wonders of modern communications, but one thing they do not dismiss lightly. It is of long tradition and a familiar concept to all: the obligation to continue searching for better ways to serve each customer—actual or potential—as and when he wishes to be served. Perhaps that may be the greatest dream with the greatest purpose of all.

Nearly 3,000 "Business Exchange" salesmen are solving communications problems for customers throughout the Bell System—to the mutual benefit of both

SELLING BETTER SERVICE TO BUSINESS CUSTOMERS

WILLIAM W. PENICK

Business Exchange Sales Engineer, O. & E. DEPARTMENT, A. T. & T. CO.

For a large mid-west industrial manufacturer, taking inventory meant a long, expensive chore; a tedious process of recording thousands of individual items on specially prepared inventory cards. It required several experienced two-man teams, which meant pulling salesmen in off the road to assist. And errors were inevitable—errors in recording and in transcribing information to permanent records.

A telephone company salesman called on this manufacturer recently and sold a communications service which simplified the whole problem.

An expensive, complicated equipment arrangement? Not at all!

Telephone jacks were installed at a number of points in the warehouse and connected to a few simple private lines to the office. Head sets equipped with long spring cords enabled the checkers to "plug in" nearest their point of operation and relay the stock information directly to the office, where it could be noted and checked against permanent records.

The results? Elimination of two-man checking teams—substantial reduction in errors—inventory time halved.

To quote the customer, "Accuracy is achieved with far less trouble than under the previous plan. The telephone arrangement has saved us at least $2,500 for the first inventory, and other benefits have accrued to the operation of the business."

Big deal? For the customer—yes. For the telephone company, this was just one of the relatively simple services being provided daily for some four and one-half million business customers of the Bell System by a special force of some 2,400 "BX" (for business exchange) salesmen.

It's the BX salesman's job to call on these business customers, to analyze their needs, to determine the appropriate communications required, and to get them to buy. Trained in solving business problems in terms of better communications, these salesmen are calling on business customers across the country: some whose needs may be served by a single telephone, others

whose operations may require a large dial private branch exchange with as many as 10,000 telephones and 40 switchboard positions.

In many instances, the problems encountered are simple and easily taken care of. A BX salesman calling on a small air line office in South Bend, Indiana, recently found that during plane arrivals the attendant was too busy to answer the second line and was simply leaving the receiver off the hook. The salesman pointed out that an automatic answering and recording set on the second line could explain to calling customers that the attendant was temporarily busy and ask them to leave their number so he could call them back. He wrapped up the sale by pointing out that calls could also be automatically answered at night when the office was unattended.

But not all answering problems are solved quite so easily.

Some Problems Require More Study

TAKE THE CASE of the great metropolitan newspaper that did a large classified advertising business. The central office lines serving its classified department were seriously overloaded by the large volume of incoming calls, yet there wasn't enough space on the order takers' desks for the additional equipment needed. Customers were complaining of busy conditions and slow answers, and business was being diverted to a competing newspaper.

A BX salesman solved the problem and sold the solution. A modern automatic call-distributing system was installed which is capable of handling as many as 200 central office lines and of serving 198 order-taker positions. The only external evidence of this large new system was a single small key box and telephone installed on each order-taker's desk. But callers no longer encounter busy conditions.

When all order-takers are busy, incoming calls are "stored" by the equipment in a mechanical "corral." When order-takers become available to receive new calls, the corral gate opens and the "stored" calls are automatically distributed to the first available order-taker substantially in the order in which they were received. Now each order-taker automatically receives about the same number of calls, and the equipment automatically sees that the earlier calls are answered first.

Telephone service contributes in many ways to the nation's defense. That's a light tank being assembled in the background.

These order turrets make possible the smooth handling of a newspaper's classified advertising.

A good job of solving a communications problem with an interesting equipment arrangement? Yes—and telephone company BX salesmen throughout the System are solving many such problems just as tough and tougher every day, with equally interesting arrangements.

But the big story today is that BX salesmen are actively seeking these customers out, making a special effort to discover their problems, and aggressively selling them Bell System services. As the telephone companies gradually catch up with the post-war demand, as equipment gradually becomes more plentiful, additional BX salesmen are being added to the job and more and more company-initiated or "scheduled" visits are being made with business customers.

True, not every equipment item needed is on the shelves all the time, but the sales people know most of these shortages are temporary. They know that the production of most of these items has been substantially stepped up this year to meet expanding requirements. They know that the day is approaching when they will be able to offer any customer anything he needs or wants whenever he wants it, and they're gearing up to do the job. In the meanwhile, they are concentrating their sales effort on the facilities which are in good supply.

The Community Approach

ACTUALLY, the initiative in this BX job was seized by some of the companies last year. A number of active sales projects were undertaken in several areas, with interesting results.

Take the case of Longview, Washington, which has been recently converted to dial. In the first 21 days of a sales campaign, five BX salesmen sold some 300 individual items of telephone service to 191 business customers—including trunks, answering sets, central office lines, extension telephones, a switchboard, and other miscellaneous equipment.

Another type of order turret does as much in a busy air line reservation bureau.

Estherville, Iowa, is a small agricultural community of 7,000 population with 3,500 telephones. Before Estherville was converted to dial, a small task force of two BX salesmen and a telephone saleswoman was sent in to make a sales and servicing canvass of selected business and residence customers. The local manager introduced the "visitors" to community leaders, including the mayor, chief of police, newspaper editor, chamber of commerce secretary, and others. The local newspaper ran a front page story complete with pictures describing the canvass, explaining that its purpose was to make certain that both business and residence customers had the type of telephone service best suited to their individual needs. And individual needs were not hard to find. About one out of every three customers reached was sold additional telephone services—a good batting average in any sales league.

In Boulder, Colorado, recently, five salesmen sold over 1000 items of telephone service to one out of every four business customers reached in the first 35 days of a special sales canvass.

These community-wide sales activities are getting under way in many other parts of the country, and business exchange sales people are devising new ways to seek out needs and develop wants.

Some Sales Activities Are Aimed at Certain Classes of Customers

In Michigan and Vermont, for example, first-class motels were singled out for special sales promotional effort with good success. At this writing, over half of the 100 motels in the selected market have been sold small P.B.X. systems with a telephone in every room. And a good many of the telephones are colored sets. One Vermont motel owner had been operating with a single eight-party rural telephone and apparently with little thought of needing more. He now proudly advertises a telephone in each of his 22 rooms.

Getting in touch with thousands of small business customers quickly, effectively, and profitably is no small job, but it's rapidly becoming an accomplished fact in Connecticut. Supplementing the regular "premises" visits made by BX salesmen, a special

force of some 18 BX saleswomen in 10 exchanges are calling one-line business customers by telephone. Services sold as the result of these telephone "visits" run literally into the thousands. Sales are being made to one out of every four customers reached.

Another special activity in the small business customer market is one recently initiated in Chicago and designed primarily to increase local message usage. A letter signed by the BX salesman and explaining the purpose of his visit is mailed to the customer a few days in advance. Then, using a specially prepared brochure, the salesman calls on the customer to explain how increased local message service may be used to improve various operations of his business. He shows him how regular telephone calls to his customers can be used to supplement his salesmen's personal visits, how the practice of calling his customers to thank them for orders received can be used to turn small orders into large ones, how personal telephone calls to delinquent accounts can improve his collection experience and regain lost business.

Training material is furnished the customer to assist him in establishing a definite program for these and other specific telephone usages. The BX salesman also makes a careful review of the customer's telephone arrangement, to be sure it is modern and complete. Though this particular activity is relatively new, results thus far are very encouraging.

Good Servicing is Fundamental to Good Salesmanship

THE SUCCESS of a sales program depends upon the cumulative success of many individual sales and servicing negotiations, and these often depend upon the ingenuity and resourcefulness of the salesman himself. BX salesmen are fundamentally good servicing people who have a good working knowledge of the communications requirements of various business operations. But they must also be alert to sales opportunities and possess the initiative to capitalize on them.

The communications required between scattered State offices in a large northwestern State capital were until recently seri-

This private branch exchange switchboard, in a department store, is one of the country's largest serving a private concern.

Year-'round low temperature does not affect the service provided by this telephone.

ously overloading the several small manual switchboards located throughout the city. The operation was inefficient and uneconomical. Attendants were required at each switchboard after regular hours and on week-ends. After a thorough analysis, a BX salesman arranged for the installation of a large integrated P.B.X. switching system to care for the combined requirements of all State agencies in the city and the removal of seven manual P.B.X. switchboard positions. At the request of the state, BX sales people also tackled State office requirements in three outlying communities and replaced privately owned intercommunicating systems in each instance with modern integrated dial systems. Net savings to the state—$13,000 in operating expenses. Increase in Bell revenues—$13,500 annually. And the service—"100% improved."

ONE OF THE FIRST THINGS a BX salesman is taught is to tailor his recommendation to fit the customer's operation—and not to expect the customer to change his way of doing business to fit the recommendation. But a salesman must use good judgment—and in doing so a BX salesman in Minneapolis recently asked a life insurance company to move to another location.

With a new building under construction and a dial P.B.X. system on order, the insurance company had leased temporary quarters and a manual P.B.X. But the business expanded so rapidly that it outgrew both the temporary space and telephone service, with the new building still more than a year from completion. It appeared from the review that a temporary dial P.B.X. was the only solution:— a large job on rather short notice and an expensive installation for so short a time.

Operators of modern motels find that telephone service is an inducement to the traveling public.

The BX salesman handling the case, learning of another large customer who had moved, leaving behind a dial P.B.X., informed the insurance company of the larger space available and let them know it was equipped with telephone service that would meet their needs. In this case, the customer did change his business operation to fit the recommendation. He leased the available space and the dial P.B.X. pending completion of his new building.

All over the country, BX sales people are finding business men seeking faster, cheaper, better ways of doing everything. They're finding them not only willing but anxious to listen to the telephone salesman who can help them save time and expense and improve their operation.

A large steel concern in Baltimore—as an example—does a substantial portion of its business by telephone, employing nine telephone salesmen to handle the large volume of telephone orders. Recently the manager appealed to the telephone company for help. Telephone orders were coming in faster than the salesmen could handle them. Customers were complaining of busy conditions and long delays, and business was being lost to competitors. The man-

ager was seeking some way to speed up the handling of the calls without adding to his sales force.

The telephone company representative found that the salesmen were spending a substantial amount of time on each telephone call in checking stock inventories of individual items. On his recommendation, an "inventory order position" was set up where current and complete stock inventory information is maintained. A two-way loudspeaker installed at this position is connected to an intercommunicating line to each salesman's desk. The salesmen, who wear operators' head sets, merely operate a key to hold the incoming call, select the intercommunicating line to secure immediate inventory information from the order booth, and then complete their discussion with the customer—all in a fraction of the time formerly required. As the manager expressed it, this arrangement provides the "split second timing" essential to his business.

A Responsibility of First Importance

IT'S BEEN a full time job for sales and servicing people in recent years to meet the ever changing communications needs of American business, and they've been operating pretty much on a demand basis. Actually, about 85 per cent of all sales and servicing contacts in 1954 were customer requests, in spite of substantial additions to the sales force. Last year 2400 BX salesmen negotiated some eighty-four million dollars in additional annual revenues for the Bell System. And still the demand grows apace. To meet this continued demand, and in an effort to get ahead of the need and seize the initiative, the Associated Companies plan to have some 500 additional BX salesmen on the job by this year's end. At the present going rate, BX sales for 1955 should produce better than one hundred twenty million dollars in added annual revenues—an impressive contribution not only to Bell System revenues but to the efficiency and economy of the business customers who entrust their communications to the Bell salesman.

So, you see, the hero of our story has quite an important job. These business customers he takes care of, though they represent only fifteen per cent of total Bell System accounts, contribute more to Bell System revenues than do all other customers combined. They are important and responsible members of the community. Their needs are usually immediate and often special in nature. His job is to satisfy their requirements completely, to retain their friendship and good will, and to see that their confidence in Bell telephone services continues to be well founded.

A report on the 10-year accomplishments of the Frank B. Jewett Fellowships and a statement of the objectives of the new Bell Telephone Laboratories Fellowships

AIDING ACADEMIC PROGRAMS IN FIELDS OF SCIENCE

MERVIN J. KELLY

President, BELL TELEPHONE LABORATORIES

THE ANNOUNCEMENT LAST SPRING of the establishment of the Bell Telephone Laboratories Fellowships, which follow upon the now completed program of the Frank B. Jewett Fellowships, gives occasion both to evaluate the contributions of the latter and to discuss the somewhat different objectives of the new grants.

In 1944, when Dr. Frank B. Jewett retired as Vice President of the American Telephone and Telegraph Company and Chairman of the Board of the Bell Telephone Laboratories, the A. T. & T. Co. established a trust fund sufficient to finance five fellowships in each of the ten years from 1945 to 1954, inclusive. They were to be known as the Frank B. Jewett Fellowships.

The applicants for the fellowships must have completed to the doctoral level an academic program in the fundamental physical sciences, including physics, mathematics, and chemistry. Each fellowship carried an honorarium of $3000 in the years 1945–1952. This was increased to $4000 in 1953 in recognition of the rise in the level of living costs since the fellowships were established. Each Fellow was free to choose any academic institution within the United States at which to conduct his studies and research. He was expected to make his own arrangements. An honorarium of $1500 was paid to the institution selected, to aid in defraying the expense of the facilities it supplied. Five members of the staff of the Bell Telephone Laboratories have served as trustees and for the award of the fellowships.

The fellowships were intended to stimulate and to assist research in these fundamental physical sciences. They were indeed a fitting tribute to Dr. Jewett. He was trained to the doctoral level in physics and mathematics in the University of Chicago, and, after a few years as professor at Massachusetts Institute of Technology, was employed by the A. T. & T. Co., where he spent the remainder of his active professional career in research and basic technology and their administration.

In our country, in the early years of this century, few men with advanced degrees in pure science turned to industry for a

FRANK BALDWIN JEWETT
1879–1949

career. Dr. Jewett was one of the first. He was a pioneering proponent of the application to industry of the research methods of science. Beyond his great contribution to the organization of research programs and their administration in the Bell System, he contributed largely to the growth and to the stature of research in industry and to its receiving adequate emphasis in the nation's military preparedness.

In recognition of this leadership, he was made president of the National Academy of Sciences, and served from 1939 to 1947. He is the only scientist from industry to receive this honor, and is one of the very few presidents of the Academy to be twice elected to a four-year term.

COMMUNICATIONS TECHNOLOGY is based on the knowledge obtained from research in physics, mathematics, and chemistry. Its progress is determined by the rate at which new scientific knowledge is obtained from research in these physical sciences. These fellowships, in addition to serving as an appropriate tribute to Dr. Jewett's career, were to make contribution to the reservoir of new knowledge about matter and radiation. These are fields essential to communications technology. And technology is the keystone of the Bell System's progress in providing communication service to the nation which is better, more economic and broadened in scope.

When the fellowships were established, relatively few such aids were available

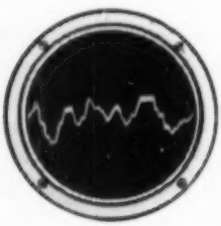
which provided adequate funds to those who had completed their doctorates—adequate, that is, for all the living costs of the candidate, even were he married. The funds paid to the Jewett Fellow made it possible for him to devote his entire time to research and study.

The honorarium of $1500 paid to the institution was also a new feature in the fellowship pattern. It was a recognition of the cost to the institution of the services it rendered the research student. Increasingly, new fellowships, as they are established, are providing similar grants to the institution. These institutional awards are becoming quite general, even among predoctoral fellowships, and there is a growing trend in providing some funds to the institution for undergraduate scholarships and fellowships as well.

There have been 380 applicants for the Jewett Fellowships. Fifty-one have been awarded to 41 individuals, ten of these having received awards for a second year. The Fellowship Committee has had a most difficult task in selection, for all applicants had ability and promise. The doctor's degrees of the 41 successful applicants were obtained at 20 different academic institutions. With two exceptions, all candidates chose an institution for their fellowship work different from the one where they obtained their doctor's degrees. This is desirable, for the contact with the different viewpoints and personalities of another group can be an important element in the maturing of these young scientists, broadening their perspective and stimulating their creative interests.

The geographic distribution (permanent residence) of the applicants provides a striking evidence of the scope of the interest of the youth of the nation in basic science. Applications were received from 35 of the 48 states. At the time that Dr. Jewett received his graduate training, he was one of the relatively few students interested in pursuing studies in the physical sciences to the doctoral level. There were only a few of our universities where training for a doctorate in the physical sciences was provided, and more than half of those interested in such training took their graduate work at a European university.

The doctoral training of our applicants was received at some 40 of the nation's academic institutions. Thus, during the professional lifetime of Dr. Jewett, academic institutions where graduate training to the doctoral level in physical sciences was provided increased from some five or six to a least 40. The interest of our youth in a career in basic science has attained so high a level that more than 300, through their application for a Jewett Fellowship, gave evidence of a desire for training and self-improvement even beyond that afforded by the doctoral curriculum.



The decorative symbols on these pages are from covers of Bell Laboratories Monographs on scientific subjects.

Under the terms for award, Jewett Fellowships were available to citizens of foreign countries. It was required only that an academic institution within the United States be chosen by the Fellow as the place for his research and studies. Among the applicants, there were 54 whose permanent residences were in foreign countries. The permanent residences of these applicants were distributed among 14 foreign countries. This is a manifestation of the growing strength and increasingly important place of our country in world science. Five of the Fellows chosen were from this group.

Fourteen different academic institutions were chosen by the successful applicants as places where their studies and research would be done. The largest number chose the Institute for Advanced Study in Princeton. This is a privately endowed center with a most distinguished faculty, where only students with a level of training and maturity of the doctoral level or beyond are admitted. Because of the distinction of its faculty, its relatively small size, and its requirement of maturity in the student's chosen field, it provides an exceptionally stimulating environment for the post-doctoral student.

The careers chosen by the Jewett Fellows upon completion of their period of post-doctoral study are of interest. The last group selected are only now completing their work, so that there is no knowledge of their plans. All of those who have completed the fellowships chose an academic career and accepted places on the faculty in the graduate schools of our country. They are distributed among 20 of our universities, their number at an institution varying from one to four.

With two exceptions, all of them are still in academic life. One of them has transferred from an academic institution to an industrial laboratory, and, unfortunately, another is permanently disabled. Bell Telephone Laboratories did not offer employment to any of the Jewett Fellows. Of course, had there been applications for employment from their number, the Laboratories would have had great interest. In their selection of Fellows, the Fellowship Committee gave weight to the evidence of interest of the applicant in pursuing a career in pure science.

NEW BASIC KNOWLEDGE in the physical sciences has been acquired through the researches carried out by the Fellows. Their professional competence has been increased by this period of study and research completely free from other activities. The added maturity gained through these fellowships has been an aid in their placement in academic positions in the leading graduate schools of the country. In these positions, through the years, they will make large contribution to the training of young scientists, and through continuing researches they will add further to

the ever-expanding store of man's knowledge.

The Jewett Fellowship plan presented new features that have been generally adopted and will have continuing values in the training of young scientists and in furthering scientific research. These fellowships pioneered the generous support at the post-doctoral level of young scientists destined for an academic career. Since their establishment, there has been a large increase in financial support for post-doctoral training and research. The honorarium of $1500 for the institution was the first recognition of an obligation to aid an institution it its support of the work of the Fellow. This practice is now almost universal.

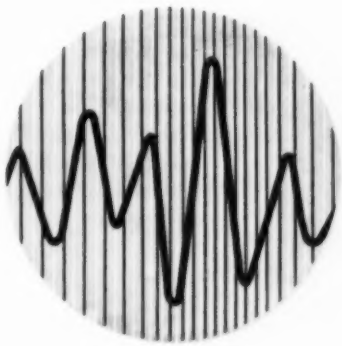
The Frank B. Jewett Fellowships, in their contributions, have indeed proved themselves the appropriate tribute to Dr. Jewett's career that was planned in their establishment.

AS THE TIME DREW NEAR for the termination of the Jewett Fellowships, the Laboratories, at the request of the A. T. & T. Co., gave consideration to "What Next?" in the Bell System's formal support of academic programs in science and technology. At the time of the inception of the Jewett Fellowships, there was great need for additional support for young scientists at the post-doctoral level. As we come to the close of the period of the fellowships, the situation has materially changed. Funds are available from many sources for the support of young post-doctoral scientists. It seemed more appropriate, therefore, to give support in an area where it is clearly needed.

The increasing depth and complexity of communications and electronics technology are requiring a more basic training for the electrical engineers in the development laboratories of communications and electronics than ever before. This situation began to appear in the early post-war years. Training to the doctoral level in engineering and the underlying sciences is becoming essential for an ever larger portion of the development engineers of a communications and electronics laboratory. Our schools of engineering and technology are not supplying enough men trained to the doctoral level to meet the requirements. As an aid in meeting this deficiency, the Laboratories established in 1948 a program of communications development training for its young engineers. All of its recruits from the engineering and technical schools are given this training, which takes almost half their time for their first three years at the Laboratories. While this training program is of great value, it is only a partial solution. In the interest of the nation's strength in communications and electronics technology, there must be more men trained to the doctoral level in the technology and its underlying sciences. It was decided, therefore, that this was an area of deficiency to which the Bell System should make a contribution.

Fellowships were planned through which funds will be provided for students doing graduate study in communications and electronics and their underlying sciences: mathematics, physics, and chemistry. These will be known as the "Bell Telephone Laboratories Fellowships." Each fellowship carries a grant of $2000 to the Fellow and an additional $2000 to cover tuition fees and other costs to the institution at which the Fellow chooses to study. (The smaller amount of the Bell Telephone Laboratories Fellowship grant in comparison with that of the Jewett Fellowship is in keeping with the lower age and training level of the candidates for these pre-doctoral fellowships.) A Fellowship Committee at the Laboratories will administer this program in much the same manner as did the Jewett Fellowship Committee. It is to be expected that the Fellows of this program will mainly have their careers in the communications and electronics development laboratories of industry and the government. The Laboratories will, of course, be interested in the Fellows as candidates for employment. Yet acceptance of the fellowship implies no obligation of either the Laboratories or of the Fellow for his later employment by the Laboratories.

It is hoped that this fellowship program, in addition to increasing the supply of men trained to the doctoral level in communications and electronics technology, will accelerate the trend toward a larger amount of graduate training in all technology.



Constructive relationships on the job come about through definite efforts as well as because human beings derive satisfaction from effective mutual accomplishment

THE HUMAN SIDE OF SUPERVISION

C. RUSSELL DEYO

General Information Manager, SOUTHWESTERN BELL TELEPHONE COMPANY

Note: How telephone workers feel about their jobs, their supervisors, their companies, influences the attitude of their friends and acquaintances toward those companies—and thus affects their standing in the community. We asked Mr. Deyo, therefore, to constitute himself an "inquiring reporter" with reference to such matters. Recently he has talked informally about their problems and informational needs with many first-line supervisors of the Southwestern Company. He contributes the following article not as the findings of an expert in this field but only as a report on how sincere efforts to create mutual respect and a harmonious atmosphere contribute to the accomplishment of group undertakings. EDITOR.

A CHIEF OPERATOR sits thoughtfully at her desk, wondering what to do about the girl who has just been transferred from another town. The girl says bitterly that she doesn't like it here. She doesn't like the people, or the office, or the town.

A chief switchman weaves his car through a big city's traffic on his way to work, his brow furrowed with concern over a story that was repeated to him as he left work yesterday. One of his men had told a friend, "The boss is gunning for me."

An Accounting supervisor runs his eye down the latest results report, his mind on the girl who has been accusing others of not doing their jobs right, complaining that they have it in for her.

Deep concern and countless hours of thought go into the handling of incidents like these. Yet just such situations are the reason why so many supervisory people say that their greatest problem and at the same time their greatest satisfaction is in getting along with people.

They did, with gifts and visits and cards. When the illness had passed, it was a different operator who returned to work, her eyes dancing with happiness at being back among her friends.

But things worked out very differently in the case of the Plant man who said his boss was gunning for him. He was a young man, the youngest in the office. The chief switchman made it a point to stop beside him early that day and ask how things were

So, let's go back and see what happened in those three cases.

First, there was the operator who didn't like her new town and its people. Over a period of weeks the chief operator talked with her many times, trying hard to understand just what she didn't like, just what was really troubling her, hoping to learn how to make her happier. The stakes mounted as time went on. The operator was experienced and competent, but her attitude began to upset those who worked with her. If the situation worsened, service could be affected.

Then one day the unhappy operator was taken to a hospital for an emergency operation. The chief operator said, "Girls, let's go all out for her. Let's show her what kind of people we really are."

going. The young man said he guessed they were going all right. The chief switchman complimented him on the good job he had been doing. At that the young Plant man looked at him sharply and asked, "Good enough to hold my job no matter what?"

In the conversation that followed, the chief switchman learned that a rumor of

future force cuts had been passed around the office. Knowing that he had the shortest service of all the men in the office, the young man had worried about several assignments he had been given in recent months and had begun to wonder if his supervisor was trying to prove he couldn't do them well. He began to feel more and more certain that a case was being built for laying him off.

"I understand the plans were okayed last week for two office additions here in town," the chief switchman said with a smile. "Does it seem to you that we'd lay off cen-

tral-office men when there's even more work ahead than we have now?"

The young central-office man thought for a minute. Then his face brightened. "I wish I'd known that before. Would have saved me some sleep." He went back to work and there was no more talk about his boss being out to get him.

And what about the third incident—the case of the Accounting girl who was so critical of others in the office?

Her supervisor searched his mind for ways to help her adapt to the group she worked with. In interview after interview he tried to find out what led to her attitude toward the others. He tried reasoning with her. He tried encouraging her. He tried being firm.

Occasionally, after a talk with him, she seemed to get along better with the others for a short time. But soon she would again be refusing to join them for lunch, and would accuse them of not handling their jobs well. A good worker herself, she harassed others until it was hard for them to do a good job. Her supervisor got only one clue to the cause of her attitude. She felt that when she had been in school, her family had praised her older brothers and sisters while paying little attention to her accomplishment.

One day her supervisor's problem was ended. She married a young soldier and resigned to go with him to a new station. The others in the office felt relieved, but the supervisor still puzzles over his failure and wonders if there was anything he might have done to help her adapt to the office.

ONE COMMON THREAD runs through these three incidents. A hard try was made to solve them. A hard try was made to find a way to satisfy everyone. In other respects they differ. In one case, no solution was found. In another, a generous, warm-hearted act solved the problem. And in the third, a key piece of information spiked a groundless rumor which threatened trouble.

Happenings like these occur every day, every hour, in cities and towns across the nation. And much free advice has been given on how to handle such incidents constructively.

This makes it difficult to keep the job of working with people in its proper per-

spective. It is all too easy to spotlight the problems and to overlook the large areas of human agreement and cooperation.

Just as a newspaper's headlines call attention to the world's troubles, so people are inclined to point to the relationships which go wrong. Actually, the significant thing is that so many things are right—that people continue to place so much trust and confidence in each other.

There's nothing dramatic in potential problems that are solved by positive action before they materialize. These are the good things you seldom hear about—yet they also are there by the thousands. The secret lies in working with people so as to establish a sound relationship.

As one chief switchman said, "The secret of good morale is treating your people the way you would like to be treated. When I've got a job to do, I get my boys together and say, 'How do you want to do it?' They're smart fellows and when they line up their own job, they do it better and faster than if I try to tell them how I want them to do it. When an American makes a commitment, he will generally break his neck to meet it. I try to get across to them that this is their business as much as mine."

Such a positive approach pays off in personal satisfaction as well as results. This same chief switchman said:

"I've developed four supervisors out of my crew and have just recommended a fifth. Every one of them is a top-notch man. That's a wonderful satisfaction."

This man is working constructively with people. And so is the chief operator who said, "Being friendly, being interested, being helpful are the keys to getting along well."

This chief operator holds regular meetings with the girls in her office to encourage a free interchange of information and ideas.

"After the meetings started," she said, "my results went up, up, up."

She has concluded, however, that there is no single solution to good morale. "It's like the three-legged stool, or maybe a four-legged chair—there's good communication, good organization, and recognition that go into it. And, of course, there's listening. We get communication through listening at all times and through meetings."

Approaches to such matters differ with different supervisors. What is natural and

easy and effective for one is foreign and ineffective for another. One finds it easy to jolly an unhappy person into better spirits. Another does not. And most supervisors, no matter what approach they find easiest, agree that they must vary their approach with different people.

Another chief operator expressed it this way: "It would be nice if there were rules you could always use in dealing with people. It would be nice if there were a formula you could apply in certain situations. But you can't apply the same rules to different people. You can't even apply the

same rules to the same person at different times. On different days they feel differently."

The time and thought which supervisors spend over such decisions naturally raises the question of just why this seems so important to them.

A chief switchman answered that question this way: "I can't do the job. The men do it. It will be a good or bad job depending on how they do it. All I can do is help them. Their feelings about each other and about me, their feelings about the job, will decide how good a job it is."

A manager maintained, "You can't separate good morale from a good job. They just have to go together."

A chief operator pointed out, "If a girl has a problem, it just has to be solved if she's going to be a good worker. And if she stops being a good worker, pretty soon she starts affecting the other girls' work."

And, of course, everyone likes to live and work in a pleasant atmosphere, as free as possible from human misundertandings.

To get such an atmosphere takes effort. It takes thought. And it takes precious time. Most supervisors will say that it helps a lot to treat others as you like to be treated. As in the case of the operator who didn't like her new town, friendly, generous treatment of others usually brings a warm response.

It helps to put oneself in the other person's shoes, in order to understand them better. "I always try to remember how I felt when I was a new operator—all confused and afraid of doing something wrong," a chief operator said.

And it helps to keep people well-informed. A key piece of information has helped solve many problems, as it did with the young Plant man who was worried about his boss and his future. People whose questions about the business are answered freely and fully, people who understand the reasons behind the things they are doing, feel better about their work.

A MAN WHO works with a large group of Accounting girls pointed out that you never know what lies behind an employee's question. "I had a girl ask me if she could get her stock a little early so she could get the dividend. I didn't know, but I found out and told her. After that I learned she had been telling others she had heard that top officials of the company could get their stock and dividend, but the rest of us couldn't. My answer to her question had stopped the rumor cold, and I never knew it till later."

In planning new work, in working out new practices, it's helpful to get the participation of employees, most supervisors agree.

"This," as one supervisor put it, "is not just faking. They're smart people. They have a lot of good ideas. Their advice is good advice and it's worth getting."

And of course every fine human relationship stands on a solid bed rock of personal

integrity. Trust in another human being must rise from a conviction that the person can be trusted, is worthy of being trusted. "You can't mislead people and get away with it for very long, and I don't try," a chief operator summarized it.

People also work better in an atmosphere of approval, supervisors say. An Accounting supervisor, for example, pointed out, "When people go out of their way to compliment me for a good job, I feel like working my head off for them. When they don't, I don't feel as interested in my work. I think everyone feels that way."

Does this mean there's no place for firmness in dealing with people? Emphatically not. There is a time and a place for firmness. People respect the person who is firm at the right time. Like pepper, firmness can be the seasoning of human relationships. But its over-use, often tempting to a man or woman in a hurry, can diminish respect and loyalty.

Such ideas keep turning up in various forms, in various words, when one talks with a number of supervisors as I have recently done.

"Get to know your people," supervisors say. "That's the first thing to do in a new job. That comes before making changes in the way the job is done. Get to know your people."

Sometimes that's easy to do. But what if the other person won't communicate? What if you can't seem to talk with him? Then the job of getting to know him may seem just about impossible. As one supervisor said, it becomes "the toughest job we have to do."

But if one is to understand another person, there must be free communication in both directions. If one is to understand, he must listen and try to guess the thoughts and feelings that lie behind the other person's words.

Although one supervisor says, "All you can do to get to know your people is be around them, give them lots of chances to talk to you, and listen," others go to great pains to break down invisible barriers which hinder getting to know and understand their people. A chief operator says she sits in the locker room at lunch time so the girls have a chance to talk with her. Plant men make it a point to take part in "bull sessions" when they think it will help.

THIS, THEN, is another challenge to supervisors—to surmount these barriers. The encouraging thing is that so much thought and study and effort go into the attack upon them.

For supervisors concern themselves seriously with the problem because they feel the alternative to its solution is ordering people to do things in a certain way. And most supervisors are eager that their employees do things because they want to do them the right way, rather than because they are ordered to. They know that this will get a better job done, and make relationships more pleasant for everyone.

HEADQUARTERS SUMMARY

June 15 to
Sept. 15, 1955

A LOW-POWER RADIOTELEPHONE SYSTEM is being used to provide communication between a test center and a telephone installers' supply truck in one district in Philadelphia. The truck is used to supply installers within a radius of eight blocks, and they rely on the common truck for all supplies and tools which can not be hand carried. Fast and reliable communication between the truck and the test center is essential.

The trial of this method of operation using radio communication has been very successful and Bell of Pennsylvania plans to extend the method to other districts.

A NEW METHOD OF RINGING underwent trial at Americus, Georgia, from June 17 to August 26 on four lines with 28 stations. The new method of signaling works satisfactorily over both rural "P" carrier and voice circuits with a maximum length of 18 miles.

This new ringing mechanism consists of an in-voice-band tone oscillator in the central office, replacing the normal ringing machines, and transistorized receiver units in the telephone subsets in place of bells. The receiver reproduces the tone received from the central office, and a transistor amplifier is used to obtain a satisfactory volume of tone to be heard by the subscriber. This provides a pleasing tone similar to a bell, since it is interrupted at approximately the same rate that the clapper hits the bell.

A SPECIAL SALES MEETING was held with the Companies by closed-circuit color television on Monday, August 15, to review a "Flowers by Telephone" plan to promote more long distance telephone usage among retail florists for intercity floral deliveries. This was the first Bell System sales meeting to use closed circuit TV. The program originated in New York and was carried to 47 cities for viewing by sales and other representatives of all Companies.

APPROVAL HAS BEEN GIVEN by the Federal Communications Commission for establishment of a submarine cable communication system connecting the United States mainland and the Hawaiian Islands, to be ready for service early in 1958. The twin-cable system will have practically the same design as the transatlantic cable—now being constructed—and the cable to be laid next year between Ketchikan, Alaska, and Port Angeles, Washington, near Seattle. Present telephone service between Hawaii and the U. S. is furnished jointly by A. T. & T. and the Hawaiian Telephone Company by means of radio circuits. Demand for service is expanding rapidly, making it necessary to supplement existing facilities.

AN INTERDEPARTMENTAL "TASK FORCE"—with representatives of Western, Bell Laboratories, and O. & E.—has recently been organized to study methods, practices, and procedures relating to the provision of central office equipment. The fundamental objective will be to devise ways and means of shortening intervals between the start of engineering and the equipment service date.

The over-all interval from engineering start to equipment service date has remained substantially the same for some time—for a typical dial unit, roughly 22 months. Many time-reducing innovations in construction of homes now make it possible for new communities with large demands for telephone service to spring up in much less than the 22 months required to provide central office equipment.

DETAILED COST STUDIES from approximately 350 Independent telephone companies covering about 600 exchanges and over 600 Independent company toll routes have been completed. These studies are intended to provide a cross-section picture of Independent toll costs incurred in handling jointly rendered business. The study data will be used by Associated Bell Company people and representatives of the Independents in reviewing present schedules used in settlements, and possibly to form a basis for some revisions in present schedules if the cost results data indicate changes are needed. The United States Independent Telephone Association has maintained an office in New York for the last six months to facilitate early completion of the studies and to act as a "clearing house" for Independent companies which were participating. The entire study has been a joint undertaking of the United States Independent Telephone Association and the Bell System Companies, with coordinating assistance from

various A. T. & T. headquarters groups directly concerned.

THE FORMER WANAMAKER BUILDING at Broadway and 10th Street in New York City has been found to be well suited for handling the new A. T. & T. Convertible offer of Twelve Year 3⅜s, due October 13, 1967. The offering ratio of $100 of debentures for each 8 shares of stock established the exact amount of the issue at $637,165,800. The conversion price was set at $148 per share.

At this writing, toward the end of the subscription period closing on October 13, the offer has proven popular with both share owners and other investors. More than 335,000 subscriptions have been received to date, and it is estimated that they will exceed 500,000 in total. By far the largest dollar amounts of subscription are made in the closing days of the subscription period, when it is expected that more than $375,000,000 in payments will be received.

THE A. T. & T. COMPANY'S WELCOME to each new share owner includes a copy of the illustrated booklet "A. T. & T.—Your Business." This booklet carries with it an invitation, in the form of a returnable check list, to ask for any of six other publications which may help the new share owner better to understand various aspects of the business in which he has just acquired a segment of ownership.

During the last year or so, the attraction of the name *Alexander Graham Bell* has made the pamphlet bearing this title the one most often requested. In 1955, the two next most popular pamphlets—"The Magic of Communication" and "The Telephone Almanac"—have edged up, with the result that requests for all three ranged between 1,250 and 1,300 during the first eight months of this year. "Early Corporate Development of the Telephone" and "The Story of Western Electric" have each run about 950 copies, with requests coming for about 800 copies of "The Telephone in America."

In all, during the first eight months of 1955 about 1,700 new share owners have asked for nearly 6,000 copies of these booklets, and there should be an upsurge in demand after the middle of December as additional share owners come in through conversions of the new debentures.

THE RESULTS OF A SURVEY of current information on the residence market for long distance telephone service have recently appeared. The findings, based on interviews with residence customers made by several market research agencies on a random basis in each of the Associated Companies, should be helpful to the merchandising activities of Long Lines and the Associated Companies. In all, 15,173 interviews were conducted, about 41% being with men. The results, which brought up-to-date a somewhat similar survey held in 1949, were weighed in terms of the interviewers' appraisal of the customers' economic status, educational background, and urban, suburban, or countryside situation.

AS OF SEPTEMBER 15 the Bell System television network linked 372 broadcasting stations in 246 cities. In addition, network service was available to 12 broadcasting stations in 10 Canadian cities.

A NEW MINIATURE AMPLIFIER constructed at Bell Laboratories combines a transistor with several other miniature components to achieve extraordinary electrical performance suitable for very wide-band services, such as television transmission. This experimental model is little more than 1½ inches long and ⅝ inch in diameter, and represents an important step toward the eventual use of transistor amplifiers in broadband transmission networks.

A POWER-DRIVEN WRAPPING TOOL was developed at Bell Laboratories not long ago to speed up the connecting of wires to terminals before soldering. This eventually led to the introduction of solderless wrapped connections. A recent Laboratories' development in this field is the combination tool, which cuts the wire, skins it, and wraps the connection, all in essentially one simple operation.

A TINY NEW ELECTRONIC DEVICE made of extremely pure silicon shows promise of reducing the cost on a large scale in many industries using electric power. This simple device, a silicon power rectifier, provides 5,000 times more current than conventional rectifiers of the same size. Two of the new rectifiers, when made about the size of peas, linked together, and mounted on a cooling fin, will furnish more than 20 amperes of direct current at 100 volts.

DIRECT-LINE TELEPHONES connected to a centrally located control console constitute a new municipal emergency reporting system recently designed at the Laboratories. The new system enables persons placing fire alarms to talk directly with fire headquarters from telephones mounted at street corners. These new call boxes can also be used for summoning police or ambulance service.

WESTERN ELECTRIC HAS PURCHASED the 430,000 square-foot United Wallpaper plant at Montgomery, Aurora Township, Illinois. The one-story building, situated on 46 acres along the Fox River, will be operated as part of the Hawthorne Works and will be used for production of dial switching equipment to meet increasing demands for telephone service. The new location will employ upwards of 1,500 employees, and will be in full operation in 1956.

GROUNDBREAKING CEREMONIES were held in June for a new addition to Western's Allentown Plant which will add some 300,000 square feet to the present 435,000 square feet of floor space used for the manufacture of electronic products. Pennsylvania's Governor George M. Leader participated in the ceremonies and construction work got under way immediately following. The building is expected to be completed by early 1957.

Construction has also begun on Western's new Kansas City, Kan., distributing house serving Southwestern Bell Telephone Company, which will replace rented quarters now being used in Kansas City, Mo. The new building, situated on a 38 acre tract, will provide some 200,000 square feet of floor space and is expected to be completed by late summer 1956.

A VOTE OF CONFIDENCE has been received by three of Western Electric's manufacturing locations. The plants in Allentown and Laureldale, Pa., and Lawrence, Mass., have qualified all of their products under the Reduced Inspection Quality Assurance Control Plan of the U. S. Army Signal Corps. Under RIQAP, the Signal Corps discontinues its regular inspection procedures and instead relies on the Company's quality control system and records, supplemented by periodic unscheduled spot checks of small samples of the product.

The Blue Pencil

ONE MAN who was, if not glad, at any rate relieved at the course followed by the early season hurricanes described elsewhere in these pages was C. C. Duncan, who contributed "Transatlantic Telephone Cable Puts Out to Sea" to our previous (Summer) issue. For not until September 21 was the eastern end of that cable safely put ashore at Oban, Scotland, and this year's task completed. Mr. Duncan still shudders when he thinks what a vicious hurricane athwart HMTS *Monarch's* course could have done to the schedule and the whole delicate operation.

Mr. Duncan had already been through one episode which left him a bit breathless. While he, ashore at Clarenville, Nfld., was talking over the cable with Captain Betson aboard the *Monarch* 1450 miles at sea on the long eastward leg of the voyage (the return half of the conversation reaching Clarenville by radio telephone), the captain suddenly announced that a loud speaker had been set up on deck and that the members of the crew—about 125 strong—would like to hear a few words from Mr. Duncan.

Taken unaware, and entirely unprepared, Mr. Duncan managed to thank those sturdy Britishers in what he hopes was an appropriate, cordial, and sincere fashion for their contributions to the advance of international communications. But since the hook-up to the loud speaker was strictly a one-way circuit, he

doesn't know to this day how his remarks sounded, out there amid the waste of ocean, nor how they were received.

SAID PRESIDENT EISENHOWER in the course of an address at a graduation ceremony last June, "In this country we emphasize both liberal and practical education. But too often it is a liberal education for one and a practical education for another. What we need is *general* education, combining the liberal and the practical which helps a student achieve the solid foundation of understanding—understanding of man's social institutions, of man's culture, of the physical, biological, and spiritual world in which he lives. This kind of education is sorely needed in this country—and throughout the world."

Mr. Eisenhower couldn't have read then the discussion of educational objectives and ideals which appears on these pages from the pen of John Markle II, for it hadn't yet been written in that definitive form. It may be, of course, that Mr. Markle was cognizant of those words from our nation's president. It seems more likely, though, that these and all such observations share in a common source—the burgeoning interest in a fuller education—and that it is but coincidence that causes them to reflect a feeling which is inherent in our times.

"THE GENIUS OF ELECTRICITY," clad in the glitter of gold leaf and holding aloft his thunderbolt while telephone cable encircles him, has stood symbolic atop the A. T. & T. Building since 1916. He first appeared in the cover design of the *Bell Telephone Quarterly*—predecessor of this MAGAZINE—in 1934, and has had his place in or on every issue since that time. We have long enjoyed his emblematic grace and have felt toward him the loyalty of close association. It was not until he was put to work on the covers of telephone directories that he was nicknamed The Spirit of Communication.

As is generally known, he was designed by Evelyn Longman (Mrs. Nathaniel Batchelder), who won with him a competition in which eight sculptors took part. We commented regretfully, in our issue of Spring 1954, upon the sculptor's death; and we are therefore happy to report that a plaque commemorating Evelyn Longman Batchelder as the designer of The Spirit of Communication has been placed on the wall of The Ohio Bell

Telephone Company's new building in Winchester, Ohio, where she was born.

NOBODY IN the eastern part of the United States needs to be told what our cover represents. The flags are flying for Connie and Diane—and not in celebration. Even as this issue was being prepared for the press, Hilda and Janet brought suffering and loss to our neighbors below the border, and a particularly vicious Ione caused loss of life and wrought damage in the millions along the seaward reaches of the Carolinas and threatened the battered Northeast anew before it took a sudden turn to sea.

Our cover was painted in oils by Charles Mazoujian; and since it may have special significance for some, a few reproductions have been prepared without lettering and will be available while they last to telephone people who will ask the editor for them.

Anyone who at this date is still interested in reading a general account of what it was like to live a night in one of New England's flood-swept little cities should seek out the September 17 issue of the *New Yorker* magazine and turn to "Across the Mad River," by John Hersey—the author who made the raw facts of Hiroshima real to an uncomprehending people.

IS IT THE new outdoor telephone booths, springing up along so many highways—light, colorful, and a welcome sight to many a stranded motorist—that account for our grow-

ing consciousness of this public convenience at every hand? Our contemporary, Western Electric's *WE* magazine, appears to think so, affirming that anything taken up by the cartoonists has achieved acceptance. And it cites a cartoon in a recent *New Yorker* in support: a vast sweep of highway crossing a lonely and limitless desert; beside the highway a telephone booth, and in it a motorist who is saying frantically, "Operator, where am I?"

Outdoor telephone booths are not a novelty, of course. One of our favorites stands at the entrance to the Mystic Marine Museum at Mystic, Conn. When the need for it developed, three years ago, somebody in the Southern New England Telephone Company had the inspired good sense to search the banks of the Thames River, near by, for some structure which would serve as an appropriate if unconventional booth. There lay the steamer *Miranda*, her usefulness ended, her hulk rotting—but her pilot house intact. Lifted from the deck, the pilot house was hoisted on a barge, brought to the Museum's dock, and installed on a new concrete foundation. So now that essential part of the *Miranda*, gleaming with paint and gold leaf, windows and wheel and binnacle intact, shelters those who would talk with others while they look out over waters the old lady will never sail again.

That's the first part of the story—and a satisfying yarn it is. The sequel is more difficult to tell, simply because it is so personal that the "editorial we" gets in the way. Let's just talk about the editor in the third person and get on with this tale of a strange coincidence.

Three years ago there came across the editor's desk the issue of the Southern New England Company's *Telephone Bulletin* for May containing the story of how *Miranda's* pilot house was being given an extended career in a different field. It was a Friday night, he and his wife were on the way to Providence, R. I., at the head of Narragansett Bay, to visit his wife's parents, and he put the *Bulletin* in his pocket to read on the train. That night he said to his wife's father, who had had maritime interests for many years, "Dad, didn't you have a vessel named *Miranda?*" and showed him a picture of the pilot house in its new setting.

"She was once mine," said the elder man, "named for my grandmother." And he went on to relate how he had designed her, had supervised her construction in a Maine shipyard, and had had her brought down the coast and around Cape Cod—for there was no Canal at the turn of the century—and up the Bay to his docks. She served him for many years, until he sold her after the first World War.

So that is why the editor, when he takes his children to the Mystic Museum, can show them the name of their great-great-grandmother prominently displayed on—of all places—a telephone booth.

HAVE YOU, by the way, a favorite telephone booth? And if so, what about it? JSB

Who's Who & What's What

(Continued from page 143)

MIAMI, FLORIDA, is not exclusively devoted to the enjoyment of leisure, and one of the busiest occupations there is the furnishing of telephone service. That is where WILLIAM W. PENICK got his start, in the Plant Department of the Southern Bell Telephone and Telegraph Company, in 1941. Soon he moved over to the Commercial Department and up the coast as a sales representative and sales supervisor—with a year and more as a Connecting Company representative—before he landed in Atlanta, in 1951, again as sales supervisor. A year later he became a sales and servicing engineer in the Commercial Division of A. T. & T.'s O. & E. Department in New York, and after two years there he went to Syracuse as division service manager in the Commercial Department of the New York Telephone Company. Back in New York and the O. & E. Department since the first of this year, Mr. Penick writes his article in this issue of the MAGAZINE from the standpoint of his position as business exchange sales engineer.

William W. Penick

Henry T. Killingsworth

IT IS PERHAPS SIGNIFICANT of our country's increasing interest in education that this issue should include two articles on academic work at post-graduate levels—each with its own viewpoint, of course. DR. MERVIN J. KELLY joined the research division of the Engineering Department of Western Electric—predecessor of Bell Telephone Laboratories—in 1918. The Laboratories were organized as such in 1925, and Dr. Kelly served successively as director of vacuum tube development and as development director of transmission instruments and electronics before being appointed director of research in 1936—the position he held until he became executive vice president in 1944. He has been President of the Laboratories since 1951.

Mervin J. Kelly

IT WAS C. RUSSELL DEYO'S contribution "Here Are the People Who Own This Business"—a description of 15 A. T. & T. share owners from coast to coast—in this MAGAZINE for Summer, 1950, which led to the request for his article describing relationships among employees in the same understanding, human terms. His Bell System career began in the Public Relations Department of the Western Electric Company in 1941, but was interrupted while he served as skipper of a PT Boat in Philippine waters during World War II. He joined the Public Relations Department of the New York Telephone Company in 1946, and was editor of the *Telephone Review* when, in 1950, he changed base—and he has been since then general information manager of the Southwestern Bell Telephone Company in St. Louis.

EDITOR

C. Russell Deyo

AMERICA IS GROWING. All you have to do is look around you. There are new stores, new houses, new highways.

The population is rising – up 18 per cent in the past ten years. And the number of Bell telephones is increasing too – up 100 per cent since 1945!

Yes, from 22½ million telephones in 1945, there are today twice as many: 45 million Bell telephones serving you, your business, and your government in all parts of our bustling nation.

It's been a big job – doubling the number of telephones to meet your needs over the last ten years.

What did it take?

Well, in the first place, the service had to be good – useful, dependable and convenient – or you wouldn't have wanted so much of it.

And that meant an enormous building job for telephone people. It meant stringing wires and laying cables. It meant putting up new offices and buildings to hold the switching equipment needed. Many of the problems were made easier because Bell Telephone Laboratories came up with efficient new methods and equipment. This equipment was produced in quantity by another member of the telephone team, Western Electric.

Over these ten years, as the number of telephones doubled, you were making more phone calls from city to city. We have tripled the capacity of our Long Distance networks. Part of this job has been to put up radio relay towers and lay coaxial cables to carry phone calls as well as television programs that can now reach 217 cities.

In these years we have met the needs of national defense – helped to create Nike, the guided missile that guards our cities – built radar stations to warn against surprise attack. And we have provided vast amounts of all kinds of service and equipment essential to the safety of our nation.

Yes, this has been a big 10-year job. It required a great deal of money: seven and one-half billion dollars in this growth. You and your neighbors have been the ones who made this expansion necessary. Your use of the telephone demanded it. Your confidence in our future has made this large investment possible.

Telephone men and women are proud to have met the challenge you placed before them. They welcome the challenge that lies ahead.

And we make you this promise: – We will do our best – at Bell Telephone Laboratories, at Western Electric, and at your telephone company – to keep growing with your needs and with our nation – to make the service better and more convenient every year.

Telephone story heard on the
Telephone Hour radio program

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